VOL. LXXXI PART EIGHT

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

AUGUST 1956

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With two illustrations in colour by E. A. BOWLES and one in colour and line drawings by MARGARET STONES

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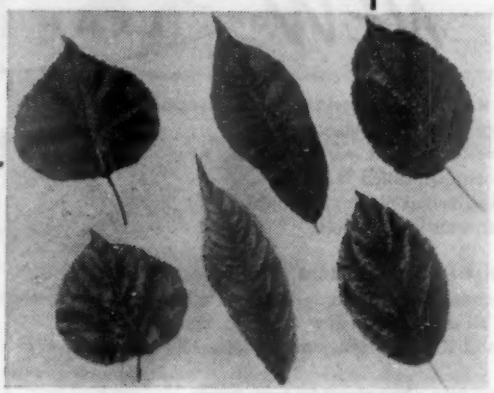

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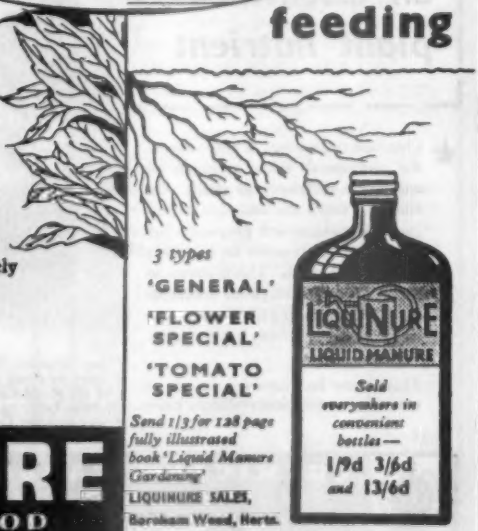

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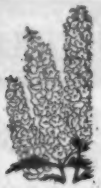

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

VOL. LXXXI PART EIGHT

August 1956

THE SECRETARY'S PAGE

ANNOUNCEMENTS—AUGUST AND SEPTEMBER

Shows

TUESDAY, July 31 12 NOON to 6 P.M. WEDNESDAY, August 1 10 A.M. to 5 P.M.	Fortnightly Flower Show.
THURSDAY, August 9 12 NOON TO 6 P.M. FRIDAY, August 10 10 A.M. to 5 P.M.	British Gladiolus Society's Show. (See next page.)
TUESDAY, August 14 12 NOON to 6 P.M. WEDNESDAY, August 15 10 A.M. to 5 P.M.	Fortnightly Flower Show. Gladiolus Competition. British Fuchsia Society's Competition.
TUESDAY, August 28 12 NOON to 6 P.M. WEDNESDAY, August 29 10 A.M. to 5 P.M.	Fortnightly Flower Show. Alpine Garden Society's Competition. Cactus and Succulent Society's Competition.
FRIDAY, September 7 1 P.M. to 7.30 P.M. SATURDAY, September 8 10 A.M. to 5 P.M.	National Dahlia Society's Show.
TUESDAY, September 11 11 A.M. to 7 P.M. WEDNESDAY, September 12 10 A.M. to 5 P.M.	National Rose Society's Show.

Shows—*continued*

WEDNESDAY, September 19 11 A.M. to 9 P.M. THURSDAY, September 20 10 A.M. to 9 P.M. FRIDAY, September 21 10 A.M. to 5 P.M.	GREAT AUTUMN SHOW, at the National Hall, Olympia. Private View from 11 a.m. until 2 p.m. on September 19.
WEDNESDAY, September 26 1 P.M. to 7.30 P.M. THURSDAY, September 27 10 A.M. to 6 P.M.	National Chrysanthemum Society's Show.

Lecture

TUESDAY, August 14, at 3 P.M. "To Turkey in Search of Bulbs", by DR. P. H. DAVIS, PH.D.

Demonstration at Wisley—The following demonstration will be given at Wisley, that on the second day being a repetition of that given on the first.

Vegetable Garden

SEPTEMBER 26–27. Digging, Double Digging, Manuring and Composting. (Commencing at 2 P.M.)

Chelsea Show, 1957—Attention is drawn to the fact that in 1957 the Chelsea Show will be held on May 22, 23 and 24. The private view for Fellows and Associates will be on May 21.

The British Gladiolus Society's Show—The Society's tickets will admit to the British Gladiolus Society's Show on August 9 and 10, in accordance with the usual arrangements, although the Show is not mentioned on the tickets.

The Society's Examinations. The Preliminary Examination for the National Diploma in Horticulture will be held on Saturday, November 17, 1956. The closing date for entry is October 1, 1956.

NOTES FROM WISLEY

J. B. Paton

DURING August and September one of the most colourful sights at Wisley is the trial of dahlias. For many years this trial was situated in the borders on either side of the broad grass walk leading to Battleston Hill; however, for the past two years this site has been occupied by the trial of early-flowering chrysanthemums and the dahlias have been planted on the trial grounds proper. This year the trial has been moved once again to a new site on the plot previously occupied by the apple

trees behind the herbaceous borders. These trees were pulled out last winter, the whole site was double dug, and a dressing of farmyard manure was worked into the top spit. As this site is rather low-lying the trial was not planted until the first week in June instead of the more usual date in the last week of May.

Each stock is represented by three plants, except for the dwarf bedding varieties of which six are planted. A certain amount of disbudding is carried out. It is usual on the giant-, large- and medium-flowered decorative and cactus varieties to disbud down to third joint, but on the small-flowered plants only the wing buds are removed. Pompons and bedding varieties are not disbudded. Fellows may have noticed on previous visits to the trial that there are a number of gaps. These are due to the policy of removing all plants which are infected with virus.

This year there are 196 varieties in the trial and the order of planting is arranged according to the classification of the National Dahlia Society. Numbers 1–69 are decorative dahlias, which are defined as having fully double flowers composed of blunt-pointed ray florets which are broad, scarcely revolute and usually flat. Numbers 70–153 are cactus dahlias, which are defined as having fully double flowers with pointed ray florets which are revolute for part of their length and either are straight or incurving. In each class the dahlias are further divided according to the diameter of the flower. Other sections represented are double show and fancy, anemone-flowered, collarette, and dwarf bedding.

It is not possible in a short article to mention all the seventy-nine dahlias which have had awards in previous years and still are retained for comparison with the new varieties. However, in the decoratives we may note 'Croydon Masterpiece' with giant 12-inch diameter saffron-yellow, orange-flushed flowers, and the velvety scarlet-red 'Viscount Bledisloe' as two good representatives of the giant-flowered dahlia more useful to the exhibitor than the gardener. In the large decorative class with flowers of diameter between 8 and 10 inches we can see the fine rose-yellow 'Colonel W. M. Ogg', the purple 'Evelyn Ogg', and 'Rozanna' whose pink petals are flushed with salmon-apricot. 'Coluna' has florets with the unusual colouring of white tipped green and was raised in England, as were the yellow-and-purple 'Leontes' and the yellow 'Lilian Compton'. From Dutch raisers plants with flowers of this size include 'Ivory Queen' and 'Yellow Show', both seen for the first time in 1955, while of older origin are 'Golden Leader' and 'Brandaris'. The last has a very striking flat open flower whose petals are yellow at base changing to bright orange-red at the tips. Another bloom with unusual colouring is 'Lady Hutchinson' in which the orient-red florets are tipped with white.

In the small decorative class are many flowers which find favour with the market grower on account of the stiff stems which carry a compact flower of a diameter between 3 and 6 inches. Two yellow cultivars are

the primrose 'Jescot Jim' and the sulphur 'Sunny', and in the pastel shades there are the peach pink 'Newby', the rose pink 'Kendal Pride' and the pale purple 'Mary Richards'.

'Searchlight' has been in the trial since 1944 and still is the leader in the giant cactus class because it produces such evenly shaped primrose-yellow flowers. Of more recent introduction the Dutch 'Vampyr' has poppy-red blooms. In the large cactus grouping 'Mary Case' was the outstanding novelty of 1953 and still is very popular. It has blood-red petals, with rosy carmine reverse, which form an excellently shaped bloom carried on a stiff erect stem. Also introduced in the same year was the primrose-yellow 'Janet Beckett'. In the medium cactus class 'White Rays' and 'Golden Autumn' both received favourable comment last year, as did the older varieties under the names 'Brother Justinius' and 'Torch'. Plants of Dutch origin are very prominent in the trials and in the red shades we noted in 1955 'Tornado', 'Bacchus' and 'Carnival'. Cactus varieties with flowers of diameter between 3 and 6 inches are placed in the small-flowered section and two typical ones are the white 'Lilian Barnes' and the rosy-cerise 'Pink Posy'.

The pompon dahlias with tubular florets forming a very compact almost globular flower are popular for garden decoration, for use as cut flowers and on the exhibition bench. The large pompon 'Bob Finch' has white flushed mauve flowers and in the medium pompon class there is the yellow-suffused red 'Leo'. For small pompon, 'Button', a yellow-flowered variety, is a good representative.

Of unusual form and a new break in dahlia breeding is the chrysanthemum-flowered 'Andries Wonder'. The florets curve in along the margins and also at the tips and the colouring is mandarin-red streaking upon a yellow ground. The dwarf bedding dahlias which usually do not grow more than 2 feet high are planted at the north end of the trial. Three Scottish varieties first seen in 1954 are 'Rothesay Yellow', the salmon rose 'Janet Miner' and the pink 'Rothesay Castle', while of the older ones the rosy-pink 'Princess Marie José', and 'Ella Britton', yellow with red markings, are still grown in the trial.

If the trial is approached through the gap in the border at the northern end of the glasshouses, visitors will notice, to the left of the path, a planting of fuchsias. These plants were grown in the glasshouses during 1955, were allowed to die down during the winter and gradually started into growth during the spring of 1956 preparatory to planting in the open ground in mid-June. They should provide plenty of colour in August and their dainty pendulous flowers carried on arching stems provide a striking contrast to the more solid dahlia flowers in the opposite border.

Particular note may be made of *Fuchsia* 'Marinka' with crimson-scarlet sepals and velvety-red corolla, the double form of 'Rose of Castille' with waxy white tube and sepals and violet corolla and 'Display' with white, pink-flushed petals and rosy-pink red-margined corolla. All these varieties are seen growing as standards on a 3-foot-high

stem. Among those growing in bush form 'Ballet Girl' has large red and white double flowers, 'Arabella' has white sepals and rosy-cerise corolla and 'Mrs. Thompson' has salmon-pink reflexed sepals and a rosy scarlet corolla. Grown primarily for foliage effect is 'Golden Treasure' with deep golden-bronze, red-veined leaves.

Behind the planting of fuchsias is situated an azalea garden and a collection of viburnums among which are planted groups of autumn-flowering colchicums which will be coming into flower as the month draws to its close. Colchicums are very modest in their cultural requirements. The principal one being a compost of well-rotted leaf-mould applied when the dead leaves are removed in late June. With tulip-shaped flowers the varieties of *Colchicum speciosum* are well represented. The dark purple *rubrum* and *atrorubens* are very similar; the difference between the two is that the former flowers earlier and is slightly paler. The variety *album* has snow-white goblets supported on soft emerald-green tubes.

PLANTS OF INTEREST AT WISLEY DURING AUGUST

ENTRANCE AND LABORATORY WALLS

Abelia × *grandiflora*
" *schumannii*
Abutilon megapotamicum
Campsis grandiflora
Penstemon cordifolius
Perovskia atriplicifolia
Rose 'Mermaid'

GLASSHOUSES

Achimenes in variety
Begonias in variety
Cassia corymbosa
Coleus in variety
Haemanthus coccineus
Hibiscus rosa-sinensis
Nerium oleander
Platycerium bifurcatum
Tibouchina semidecandra

FRAMEYARD WALL

Ceanothus 'Autumnal Blue'
" 'Henri Desfosse'
Clematis rehderiana
Magnolia grandiflora

WILD GARDEN

Cyclamen neapolitanum
Cyrilla racemiflora
Gentiana asclepiadea

WILD GARDEN—*continued*

Hydrangeas in variety
Oxydendrum arboreum
Tropaeolum speciosum

SEVEN ACRES

Buddleias in variety
Heather Garden
Gunnera manicata
Hypericums in variety
Spiraeas in variety

WEATHER HILL

Rose border
Annual Border

AWARD OF GARDEN MERIT COLLECTION

Ceanothus 'Gloire de Versailles'
Eucryphia glutinosa
Fuchsia magellanica var. *riccartonii*
Romneya coulteri
Rose 'Fellemberg'

ROCK AND ALPINE HOUSE

Amaracus pulcher
Carlina acaulis var. *caulescens*
Crassula cooperi
" *sarcocaulis*

ROCK AND ALPINE HOUSE—*continued*

Gazanias in variety
Gentians in variety
Gilia californica
Hypericum 'Rowallane Hybrid'
Leucojum autumnale
Phlox carolina
Polygonum affine
" *vacciniifolium*
Trichinium manglesii
Tunica saxifraga pleniflora
Zauschneria californica

BATTLESTON HILL

Agapanthus in variety
Daboecia cantabrica
Fuchsia magellanica var. *gracilis*
Hydrangeas in variety
Lilium tigrinum

BATTLESTON HILL—*continued*

FLORAL TRIAL GROUNDS

Trial of Chrysanthemums
" " Dahlias
" " Gladioli
" " Godetias
" " Lobelias
" " *Salvia splendens*
" " Zinnias

VEGETABLE TRIAL GROUNDS

Trial of Climbing French Beans
" " Melons
" " Onions
" " Runner Beans

MASTERS MEMORIAL LECTURE, 1956

THE IMPROVEMENT OF STRAINS OF VEGETABLES

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(*Lecture given on March* 27, 1956; MR. F. A. SECRETT, C.B.E., F.L.S., V.M.H., *in the Chair*)

PART I

MY first duty is to thank The Royal Horticultural Society for the great honour they have done me in asking me to talk to you today. It appears that the subject, which both your secretary and I have agreed on, is sufficiently wide to justify two successive lectures, and yet, while preparing the plan of these lectures I was much embarrassed. The breeding of vegetables, as well as the breeding of other plants is, in effect, essentially based on that wonderful science of genetics, and no technical account can be comprehensible without an elementary knowledge of that science. I think I am not mistaken in supposing that you possess this knowledge, in supposing that the laws of MENDEL and the chromosomic theory of heredity, as well as notions of factor, character, genes, mutation, are as familiar to you as those of crossing, segregation, homozygothy and heterozygothy. The well-known scientists who have lectured to you during the past years, preceding me here, have made you

fully acquainted with the science of heredity and led you to the very nucleus of the cells in which is hidden the destiny of living beings; I therefore feel fully justified in talking to you about these beloved vegetables and of their improvement, without exerting myself quite unnecessarily so as to spare you the strictness of a stern but indispensable vocabulary.

The palaeontological and archaeological documents that we possess do not enable us to retrace with precision the history of vegetables since the appearance of man on earth. However, we are well enough informed to be able to build a few hypotheses about the evolution of the most important plants cultivated in our western lands at the present time and to assert that this evolution was at the same time geographical and genetical, if I can be allowed to use such a modern term when speaking of prehistoric periods.

Our ancestors, who lived at the beginning of the quaternary period, some two or three thousand centuries ago, had no doubt a rather difficult life; we can get an idea of it by observing the ways of the pygmies and of some of the wild nomad tribes still existing nowadays in North and South America. The chase provided them with the essential part of their food at the cost of considerable fatigue and skill, and they picked up wild, edible species of vegetables, chosen thanks to a particular sense that we have no doubt lost, but that animals still possess. During the neolithic epoch, while cereals were already widely cultivated, horticulture did not exist and wild plants alone were made use of. It is highly probable, moreover, that man's attention was attracted during the great migrations of species, much more by wheat, barley and oil-plants than by vegetables, which, with the exception of peas, lentils, chick-peas and broad beans took a very small place in his nourishment. One can consider that the most commonly eaten herbs settled spontaneously around the dwellings, where they found a soil rich in organic matter and developed themselves under conditions very similar to the ones created by our market gardeners. Variations, mutations then appeared as they do nowadays in our gardens and it was the first step, a rather timid, a rather hesitant step towards the improvement of vegetables—improvement considered evidently from men's point of view and not from the one of the plant itself. From then on the observant mind distinguishes those goose-feet (*Chenopodium*) or those mustards more developed with larger leaves, those tenderer and fleshier thistles; it becomes obviously necessary to separate them from the populations, to cultivate and multiply them, and so horticulture and genetics come simultaneously into being.

But this brief outline does not give us an answer to the important question of the geographical origin of our vegetables. It is within the scope of any botanist to notice, in the midst of the spontaneous natural flora of our countries, the presence of a quantity of wild species obviously related to the cultivated plants: carrots, beetroots, cabbages, salsifies, scorzoneras, chicories, celeries, sorrel, corn-salad grow profusely

around us and the direct ancestors of the vegetables we eat can be easily recognized in them at first sight. In most cases, on the contrary, the improved forms did not spring up on the spot, but came to us from very far away and notably from the great centres of dispersion of Western Asia and of the Eastern Mediterranean. It is, for instance, from Iran that the radish, the turnip, the kohlrabi, the garlic, the onion have made their way towards us. It is the Eastern Mediterranean that has supplied us with the lettuce, the endive, the fennel, the cardoon, the cabbage, the parsley, the chervil, the shallot and the leek. We owe cucumbers to tropical India, melon and water-melon to inter-tropical Africa; as for the pea, which has never been found in the wild state, it has been cultivated for ages, under very diverse forms, in Asia, in Eastern Europe and in Egypt; it probably hails from Western Asia. From our countries all we have obtained is the parsnip, known by man merely since the first centuries of our era; chives, the propagation of which occurred during the fifth century and some species more recently introduced into cultivation, such as salsify, scorzonera, corn-salad, brussels-sprout and chicory. Cauliflower probably came to us from the Levant and was but very little cultivated in Western Europe in the middle of the sixteenth century. Finally, the time has come to remember that, at the same epoch, America enriched our gardens, contributing to our capital by endowing us with beans, potatoes, tomatoes, maize and pepper.

It would take too long to retrace under your eyes, the courses these precious plants followed through the ages. I would stray too far from my subject if I showed you peas, lentils, cabbages, broad beans and turnips arriving in Central Europe with the brachycephalic (short-headed) men from Asia, established between the dolichocephalic (long-headed) men of Northern Europe and those of the Mediterranean Sea, if I followed with you other species from Abyssinia up to Egypt and from there, by the medium of the Arabs, up to Spain and then up to us. Let us rest content to know that our vegetables followed diverse roads in the course of the migrations of those men, who after having limited themselves to collecting them in nature, undertook to cultivate them, either because they were growing scarce in their natural state, or because they had started to play an important enough part in their nutrition to be worthy of being taken with them on their travels.

If you are willing to think now of the immensity of the time that elapsed before the historical epoch and even since that epoch, it becomes evident that those wild plants distinguished by man had plenty of time to vary; our ancestors, many ages ago and in different parts of the globe, applied real methods of selection, methods that we nowadays call empirical, but that, nevertheless, command our respect when we consider the state of the biological knowledge of their time. There appeared, following this selection, from the main characters which are the rule in the centres of origin, some successive characters of great value to man, such as the lack of parchment in the pod of the pea, the thickened receptacle of the flower-head of the cardoon, which gave birth to the

artichoke. The most typical examples are those of peas and broad beans of which the recessive form with little seeds is found in the mountainous group located between the Himalaya and the Hindukush, the density of the recessive types increasing progressively as you get closer to the Mediterranean. At the origin of the improvement, we notice the more or less methodical exploitation of the disorderly variation that reigns among plants, exploitation without which many genes useful to humanity, but of no particular advantage to the plant itself, would no doubt have disappeared. Besides, we frequently observe that our vegetables have a predisposition to revert to the wild form from which they originated, and that we are only able to maintain them thanks to a permanent selection. As far as I am concerned, I do not think that the widening of the rib which transformed a beet-root into a Swiss chard, that the mutation which produced secondary buds on the cabbage so that it became a brussels-sprout, that the loss of the sharp thorns of the cardoon and the artichoke, would have been maintained through the centuries without the watchful intervention of men. You have there, indeed, genuine creations in the true meaning of the word, that is to say genetical types isolated and preserved by cultivation, but naturally without the interference of those scientific methods which only appear later on. What is more, it is not certain that the Egyptians, if we consider the extent of their mathematical knowledge and of their artistic genius, did not practise a methodical and even scientific selection of a sort, as the Chinese did along the centuries.

The development of horticulture by the people of ancient times marks a new step in the improvement of vegetables. Cultivated under dry conditions or under irrigation, taken away from their natural conditions of life, plants often give, it seems, free course to variation, to burst forth from their hereditary potential, to the emancipation of those genes held prisoners in their milliards of cells. Cast a glance at horticultural literature, and you then will read on each page that such or such useful plant, fruit tree, ornamental species or vegetable "has been improved by cultivation"; either the fruit suddenly became more colourful or more tasty, or the size of the flowers increased or became double, or the number of its chromosomes was modified with all the morphological and physiological consequences that those cytological disorders imply. We are not familiar with the determinism of those variations, of those mutations that appear under the influence of the climatic and cultural complex, but they are evident and we have no reason to believe that they did not start to appear in the infancy of horticulture. We know from archaeological documents that the Egyptians cultivated, five or six thousand years ago, peas, broad beans, lentils, cabbages, and asparagus. We also know that cabbage enjoyed a particular popularity amongst them, that they invoked it as a divinity and used it to cure drunkenness; if some strains were specially selected for the fight against alcoholism, they have not reached us and we can be allowed to regret it!

Though no precise fact allows me to be definite, it is likely that, side by side with the mutations, hybridization also played an important part in the primitive transformation of cultivated vegetables; either the mutants got crossed with the original types, or certain improved species found themselves in contact in the early gardens, under conditions well suited to those casual and illegitimate unions, analogous to those that we still nowadays have such difficulty in avoiding.

You now perceive the wild vegetables with dominant characters escaping from their centres of origin, travelling slowly westward, at the same time differentiating themselves by accumulated mutations; you observe man taking interest in them, you see a more and more improved horticulture intensifying and accelerating their variations. Thus, hundreds of centuries pass, the historical ages are reached, the Egyptian, Arabian, Greek and Latin civilizations fade away, while around the Mediterranean a biological store has accumulated, that contemporary man has a mission to exploit. In fact, things happen in a much more complex way, but we will probably never be able to untangle the mingled and ramified threads, that make up the skein of the history of vegetables and their improvement. Think also of the fact that the words used in ancient literature are so diverse and confused that it is often difficult and sometimes impossible to translate them; we had to wait for the early artistic reproductions of plants in the sixteenth century to give us the first precise pictures of cultivated vegetables. But the sixteenth century is yesterday, and yesterday our cultivated plants had progressed surprisingly little; ligneous and often colourless carrots were consumed; cauliflowers had small heads, scarcely bigger than the fist; spinach had narrow, hastate, pointed leaves; the vegetable beetroot a thin and fibrous root. In defence of our near ancestors, it must be said that three hundred years ago it was not possible to conceive any improving breeding, from lack of knowledge of floral biology. It was the discovery of the mechanism of fertilization that led to the great advances made in the eighteenth and nineteenth centuries, advances that opened the way to the amazing developments of genetics from the beginning of the present century onwards. The nineteenth century, which was that of pre-Mendelian selection, and the twentieth century, which was that of applied genetics, have done more for the improvement of cultivated plants than the hundreds of thousands of years that have elapsed since the first man.

Nevertheless, numerous documents, and particularly the catalogues of the oldest established seed merchants and horticulturists, show us that, around 1750, a great many of our vegetables already existed in a state very near to their actual one. The old method of mass selection, selection which consisted in collecting seeds on the plants offering to the highest degree the characters that were being looked for had, by then, been already highly successful, in spite of its slowness. Though it was already known how to isolate and propagate casual mutations, the number of the varieties, of the cultivars (to use the excellent word

recommended by the Rules of Nomenclature), was much smaller in each genus than it is now. It is to hybridization and to pedigree method that we owe the great diversity, the increasing abundance of the cultivars from which we draw profit today, but from which we also suffer; I shall take the liberty to enlarge on this point, for these methods, though relatively old, are still at the base itself of plant improvement, concurrently with the most modern processes.

What are we looking for when we go in for improved selections ? We are trying to obtain a new strain, offering better qualities than those of its parents; we are trying to cause the appearance of one or several entirely new characters, or the more often to group, on one and the same plant, qualities shared by different plants. The objective can well be merely to modify one important character, as for instance the sensibility to a virus of a cultivar of a lettuce; it can tend to modify several characters, the colour of a tomato and the size of its fruit; maybe also the height of the plant and the shape of its foliage; it can affect not only the physical character, but also the physiological properties of the plant, such as precocity, lateness, the sugar or dry matter content, etc. The improving selection consists, in short, in manipulating genetical factors in such a way that they manifest themselves in the shape of new combinations, presenting measurable qualities more advantageous to the user. The more important of these qualities can be, for vegetables as a whole, the gustatory value, the richness in nutritive matter, the adaptation to climate, the resistance to diseases, the precocity, the lateness, the yield in weight, the preservation. The manipulation referred to is brought about by way of systematic hybridization. But, naturally, the factors that condition these diverse characters do not behave in the same way in all vegetables. The colour of the pulp of a vegetable beetroot does not have the same genetical value as that of the fruit of a tomato; dominant precocity in certain species can be recessive in others; furthermore, we know that, while certain characters are ruled by a single gene, others need, to become apparent, the co-operation of several genes, which singularly complicates the problem. It follows that the breeder, if he wishes to avoid those gropings that cause loss of time and money, must be acquainted, as well as possible, with the hereditary patrimony of the living stock on which he is working, or, at the least, know the hereditary comportment of the most important factors. Many obscurities still subsist in this sphere, and chance continues to play a part favourably or unfavourably, beyond all expectations. Great difficulties still remain for the breeders who carry out their experiments on large numbers of vegetable species, and it is the reason for which we notice today a certain tendency to specialization: tomato, pea or bean specialists, as well as specialists for the improvement of wheat or maize.

I must apologize if I am now obliged to remind you of what happens when hybridization is carried out between two cultivars of vegetables differing from one another in one or several different characters. Let us start by examining the first case, and let us cross a green-seeded pea

with a yellow-seeded pea. The seeds of the first generation (F^1) are exclusively yellow, according to the predominance of yellow over green. But these plants F^1, self-fertilized, produce an F^2 generation singularly less uniform, in which 75 per cent. of the individuals are phenotypically yellow-seeded, and 25 per cent. green-seeded. We will ignore the latter, which are fixed recessives on which selection can have no hold. On the other hand, genetical analysis will reveal that the 75 per cent. remaining are actually of two sorts: 25 per cent. are pure dominants, fixed and equally refractory to selection, but 50 per cent. are hybrids identical with F^1, and which will, in the course of future generations, behave in the same way. This extremely simple case is of no interest to us here, except to initiate us to the next one, in which the parents differ in two characters; it is what we call dihybridism. There again, the plants of the first generation are all uniform and unstable, but those of the second generation offer an increased variability, corresponding to sixteen possible combinations, showing differences following the formula 9: 3: 3: 1. Moreover, curiously enough, two new combinations appear, pure, constant and fixed, that can be separated by cultivating the F^2 plants apart. In fact, it is on these new, systematic, calculated and mathematically foreseen combinations that rests the improvement of vegetables according to the pedigree method. Naturally, the larger the number of differential characters between the parents, so the number of new combinations in the F^2 generation will be larger also.

The paths followed by plant breeders are strewn with thorns, but they are also sometimes bordered with flowers growing around cool springs; few satisfactions are comparable to that, which the breeder experiences, when he undertakes the observation of that throng of original combinations, torn from the mystery of chromosomes, and which appear for the first time on the surface of the globe, though in potential existence for dozens of centuries. Genuine creator, supreme measurer, he revolves in the midst of a new world, casting into outer darkness those of his creatures that fate has poorly endowed, retaining carefully, on the contrary, those who have responded to and sometimes exceeded his most sanguine hopes. Disappointments are inevitable for, more often than not, none of the new plants offer value sufficient enough for horticulture. The greater the improvement of vegetable species, the more difficult it becomes to obtain outstanding new cultivars; if it was not so, the breeders would rapidly become millionaires, and certain of them could give up genetics to devote themselves entirely to the joys of fishing or stamp-collecting.

Let us then suppose that the second generation of a hybrid holds out one or several new and promising subjects; it follows that they must, from now on, be fixed, which does not present too many difficulties if we are dealing with self-pollinating plants, like peas, beans, lettuces, from which it is easy to obtain pure lines by successive inbreeding, but which is slightly longer and riskier with cross-pollinating plants, such as cabbages, spinach or beetroots. All kinds of techniques then ensue,

which are at the same time too numerous, too complex and too classical for me to think of setting forth. I shall limit myself to two brief remarks: the cultivars of "cross-pollinating" plants are a collection of theoretically identical individuals; the deviations that can be observed amongst them can only spring from accidental crossings, unavoidable if every kind of care is not taken in isolation, or from mutations, or from mixtures. On the other hand, the cultivars of "allogamous" plants are but populations composed of individuals, of which a certain number of essential characters only are genetically pure and fixed, but which differ more or less in their secondary heterozygous characters. Those populations are merely maintained by genetical breeding in as near a state of purity as possible. Finally, I will emphasize that the new combinations obtained by hybridization are often not immediately utilizable, for they are accompanied by deficient characters derived from genes born on the same chromosome and transmitted as a whole during the course of the meiosis. It is up to the genetician to sever these deplorable associations of faults and qualities—an undertaking in which he is not always successful; in the case of several beetroots, fifty generations have not succeeded in breaking up the intimate union of the high sugar content and the elongated shape of the roots, or if you prefer, the intimate union of the flattened shape and the low sugar content. But, outside of these cases of physical incompatibility, there is no theoretical reason why dispersed characters in diverse plants of a similar botanical species should not be reunited on the same individual. It even happens that certain qualities appear with an increased intensity, according to the curious phenomenon of transgression, different from heterosis or hybrid vigour. However, if genetics allow one to juggle with genes, to associate them in a thousand ways and to compel them to reveal all they hold in power, it still remains that men are but turning to account an existent material, that they have only combined or modified that which nature has furnished and the origin of which remains profoundly mysterious.

The problems that have to be worked out by whoever devotes himself to the improvement of vegetables are of great complexity. They are certainly even more difficult to solve than those offered by cereals or ornamental plants. In fact, as I have already mentioned, the success depends largely upon a thorough knowledge of the hereditary patrimony of the living stock; vegetables, except for those such as tomatoes and peas, have not yet given rise to very elaborate analysis; some of them have been but the subject of work unexhaustive enough to be any useful guide to the experimenter. Cereals, and notably maize, ornamental plants such as antirrhinum and phlox are genetically much better known.

Now, the circumstances are often more complicated than this general sketch I have made allows us to suppose. The hereditary patrimony is a very complex world, often unstable and often full of disagreeable surprises. We are nowadays very far from the laws of MENDEL and from the simple mechanisms they set forth less than a century ago;

complementary factors, incompatibility, partial or total sterility, lethality partial or total, polyploidy, sexual heredity, cytoplasmic heredity, heterosis, etc., are so many phenomena detected by our century, most often by the light of the chromosomic theory of heredity, to say nothing of the knowledge of mutation and its applications; we have there a considerable amount of biological phenomena, from which the selection of garden plants does not escape, and that are far from being completely elucidated. Whatever a genetician's learning may be, I am not afraid to say that he alone cannot assume all the operations of a type of work that, at every moment, calls for experience in other branches of science, such as chemistry, biochemistry, entomology, microscopic cryptogamy, and obviously mathematics, failing which no modern genetics could be conceived. We have a right to wonder whether, before long, applied genetics will not completely elude the competence of the individual, to become concentrated in those institutes armed with the indispensable team of specialists and with the equipment they require.

We have today cast an inevitably superficial glance at the history of the improvement of vegetables in general, and on the birth of the classic methods most currently employed; we will attempt, next month, to become acquainted with the most recent developments of genetics and with their application with the view of increasing the glory of our kitchen gardens and market gardens.

LABOUR SAVING IN THE GARDEN

Sir William Godfrey

(Part of a Symposium held at the Horticultural Club on Tuesday, November 29, 1955, MR. ROY HAY *in the Chair*[1])

THE CHAIRMAN: I should like to begin by telling you that SIR WILLIAM GODFREY is senior partner in a firm which has specialized for many years in motorized equipment for the garden, and he represents a firm which you can look upon as consultants. I think that the time is very shortly coming when all gardens will have to be tailor-fitted for equipment, because there is no such thing as the best motor mower: The best motor mower for you is the one that suits your garden.

SIR WILLIAM GODFREY: The subject of garden mechanization is so big nowadays that I do not think I could cover it fully in less than three hours. I will try to relate it to the machines that are used in my own garden, by my wife and myself in our spare time. The use of about six machines has taken the place of a whole-time man, and I think we are doing the job rather better.

[1] MR. A. GRAY, horticultural adviser to the Central Electricity Authority, also spoke about the application of electricity to horticulture.

The most remarkable thing is that the six machines that we use cost less than a year's wages for one man.

The first thing that we had to do—and the first thing that anybody has to do in mechanizing a garden—was to plan the garden in relation to machines instead of to a team of gardeners. There are a lot of things that have to be done differently if you have machines. You have to think in terms of, "Can I do that with a machine, or can I alter it to suit a machine?" I have in mind one case where, by eliminating a bank of grass and replacing it by a wall I cut down labour; but in the end I went back to a bank because I had bought a mowing machine that likes grass banks. Of course, one never gets to the end of this business!

The next thing to do is to plan all your machines in relation to each other. The various machines overlap one another—mowers with cultivating attachments and cultivating machines with mowing attachments, etc. If you buy one and then, without due thought, buy another, you will probably finish by being able to do one job three times over and not be able to do several other jobs at all.

Another point in regard to planning a garden is that if you take over a derelict place, it is much better to borrow or hire a big machine if you are only going to use it once. You can waste a lot of money in buying a big machine that you will not need later.

Personally, I dislike so-called multi-purpose machines. They only work at about 50 per cent. efficiency and you waste an enormous amount of time in changing from one tool to another. You cannot get a small-horsepower machine that will do all types of work. The smallest that I know is a 5-horsepower, American-made machine, which is admirable, but I think you could buy six machines, each a specialist in its own job, for the price of that machine with six attachments.

Do not think from those remarks that I dislike attachments. You can get good static attachments, such as generators for hedge trimming, or spray pumps, which are made for most garden machines, but whatever anyone may say, I do not believe you can plough decently with a machine designed as a rotary cultivator, and you cannot do rotary cultivation with something designed for ploughing. Most of the mowing attachments are perfectly all right on cultivators.

I will deal first with mowing, because I think it is still the most important form of mechanization in the garden.

There are, basically, three different types of mowing machine available: the roller-driven cylinder cutting machine, the side-wheel one (which is quite new on the English market in a motorized form), and the rotary grass cutter. The rotary and the side-wheel will cut much rougher and longer grass, and they will probably cut it very nearly as short but with not quite as good a finish. I began seven or eight years ago with a rotary grass cutter, because my grass after the war was not fit for anything better. The thing that has surprised me is that I cannot get rid of that machine. It is only a secondary machine to me now, but it is still quite unique and there is no other machine on the market that

can take its place, and if I were reduced to having one machine, I think this is the one that I would have to have. I should hate that to happen, but this machine has certain features which no orthodox machine has. I can cut with it the odd place where bulbs have been grown and the grass is a foot long and well trodden down. It will cut lawns when they are about 3 or 4 inches high. It cuts banks and picks up wormcasts. I can change the cutters myself, replacing them in a minute or two, instead of sending it away to be reground and adjusted. It is an extraordinarily valuable secondary machine to almost anybody who needs two machines and it is a very valuable first machine to anyone who has never had a motor mower before.

After about four years, I bought a perfectly orthodox 14-inch motor mower of well-known make, and I found that I was not using it more than very occasionally because the rotary was nearly as good. Two years ago I bought a 16-inch electric machine and I could not exaggerate the pleasure that this gives us. Silence, if one can get it in any garden machine, is worth a great deal—and the electric makes no more noise than a hand machine. I can turn the electric machine into a push-machine with driven cutter, which is useful in awkward corners. I can cut up a short bank with it by giving it a little assistance—and I cannot assist a motor machine. When I had a motor machine I had to cut along the bank and then there was a nasty crease between the bank and the lawn. Now I have a perfectly smooth run and the bank problem has been solved. Many people ask whether the cable is not a great bother, but it is no more of a nuisance than it is with a vacuum cleaner. All that you have to do is to keep it on one side of you and to work away from it. If you are afraid of damaging a flower-bed, you can stick a bamboo at the corner and pull on that, so that you do not drag the cable over the bed. A disadvantage is that like all roller mowers it throws the grass in front, which makes it difficult to leave the clippings on the lawn in dry weather. In my case, whenever possible I now use a lawn sweeper instead of a grass box. I prefer to collect the clippings a day or two later when they have wilted as they then make a really lovely material for mulching. When I use a grass box my barrow always seems to be the wrong end of the lawn and the greater capacity of the sweeper is a considerable time saver.

Sweepers are not, of course, new, for they have been with us now for thirty years or so, but they did not become popular until last year, and I cannot now imagine gardening without one. I use it a great deal for picking up worm casts as well as for leaves and things of that sort; but I find that it also gives a very good scalp massage to the lawn. I have no doubt in my mind that, in spite of the dry year that we have had, my grass has been far greener as a result of using a sweeper than it was before I used one. This last could have been achieved with some of the grass renovation equipment that is now readily available, but I have not used any of that equipment sufficiently to be able to talk about it.

I mentioned side-wheel motor mowers. These are quite new in the English market, though common elsewhere. Side-wheel hand mowers have been with us for a long time, but motor mowers have always been of the roller type. The side-wheel machine will cut longer and rougher grass, and undoubtedly it goes over the ground much more quickly. This machine is very useful in those cases, which occur with everyone, where there is a bit of lawn that ought to have been cut but was neglected because of holidays or some such reason. There is one on the market now that has a safety clutch which releases the cutting cylinder as soon as it picks up any dirt, sticks or the like.

Turning now to cultivators, which I think come next in importance; until very recently all garden cultivators were nothing more nor less than miniature farm implements, and they simply did a miniature farm job, instead of doing a full-sized job on a small scale. Their evolution was quite natural from the horse to the tractor, being then reduced in size for the smallholder and the nursery, but the nurseryman had nice long rows, whereas garden plots are generally small and under a wall and lack headland for turning. There was a tremendous amount of time wasted in changing tool heads and a tendency to find that it was not worth getting the tool out for a twenty-minute job; it had to be a big job to make it worth while. These things tended against the acceptance of cultivators for garden use. When one wanted to do ploughing, which made a perfectly good substitute for digging, it was no good doing 3-inch ploughing; it had to be a 5-horsepower machine which was a man-killer and probably too long to turn. When it came to fallowing a bit of ground just cleared of crops, it was too much trouble to get that type of machine out. You could have done it with a smaller horsepower machine and ploughed 3 to 4 inches, but even then you would have had to change the plough over to a cultivator and go over it again. If you tried to make a seed-bed with tools of that sort, you went over the ground six or seven times and trod it down.

Rotary hoeing was a completely fresh approach. Rotary hoes began with patents taken out in Australia by MR. HOWARD in 1917—MR. HOWARD is making rotary hoes in this country now. At the start they got a very bad reception in England. In the 1930s there was only one Swiss-made model available, and it had wire tines which tended to bend in clay or break in stones, and they went round far too quickly, upsetting the soil texture, and you had real trouble in wet weather after you had used them. With the modern flat-blade tine it is years since I have seen ground spoilt by rotary cultivation. I know that there is a great deal of controversy about whether they are fit to use in the garden or not, but on the agricultural side they have become accepted practice. To my mind, anything else but a rotary is unthinkable in a garden and you must try to apply it to your own conditions in order to get the right results, and not just write it off.

For one thing, the rotaries are not man-killers. I am not certain why they should be so much easier to work, but I think the reason is that the

rotor and the wheels are co-operating to move the machine forward, and that probably makes them easier to control. It also gives about double the effective horsepower.

As a digging substitute, rotary hoes will dig up to 12 inches. I am content with a 2-horsepower one that will go to 7 inches, but some people may need more. It turns the soil over in such a way that it oxygenates every particle in very much the same way that frost does, but, of course, you can do it when you wish and not when the frost happens to come. I have had an example of this on some ground that had been an orchard. I rotavated it in September and again in October, and in November I planted it with apple trees. I found that the texture of the soil was just as if it had been broken down by frost—it could not have been better. There was one corner, where tree stumps had been lying, which had not been rotavated, and there it was like digging a spade into putty. You can fit a furrower so as to leave the soil in ridges for the winter if you want to do so, although I rather doubt that this is necessary.

These machines for digging purposes vary in size from a 2-horsepower machine which will dig 7 inches deep and 10 inches wide, to 8-horsepower, 30 inches wide and 12 inches deep—the latter, of course, being bigger than is needed in most gardens.

I think that undoubtedly these machines will make a better seed-bed than you can make by hand. With them you can bring the weeds forward; if you rotavate the ground about three weeks before you want to sow it, the weeds will sprout, and then you can go over the bed very shallowly a couple of days before sowing it, and this seems to give you a clean run.

Incidentally, in using the machine as a digging substitute, I recommend that you go as shallow as you can for the first cut; just get under the weed roots and no deeper, give the weeds a good shaking on the surface, and then try to get down as deep as you can as quickly as you can. In other words, try to go over the ground twice rather than three times, or three times rather than four, because you do not want to disturb the soil structure unnecessarily. I have been asked why these 2-horsepower machines are not provided with a reverse gear and can only reply that up to perhaps 4-horsepower they are, or can be, very light to handle and I do not think any lady operator will find them too heavy to pull back.

In fallowing any land or running through a bit of land after you have cleared a crop, you can get a rotary hoe out very easily and you have no changing of the tool head. This is important if you have only a small bit of land to do; it is worth doing it with a rotary hoe, it takes perhaps ten minutes or less when it would have taken half a day or more with hand tools. I have heard it suggested that when a rotary hoe is used it makes a pan at the bottom of the furrow. I do not think it does. It certainly leaves a smooth bottom below, but it does not press on this in any way and you can fit what is called a pick-tine and go down a bit deeper to break the pan if you are worried about it.

There are three different sizes of rotaries. There are the ploughing machines, which are usually too big for the garden. Personally, I keep to the middle size, the 2-horsepower machine, because with it I can do everything. I can do the hoeing, the fallowing, the seed-bedding and the ploughing. As for the small ones, I think there are only two on the market, costing less than £60. One is a perfectly orthodox smaller brother of one of the bigger ones. The other is an extraordinary machine which is quite unique in England, although there are American machines of the same sort. The wheels are not driven at all, and the rotor itself pulls the machine forward. This machine has certain great merits. I could rotavate a piece of ground the size of this table at which I am standing with it, and in doing so I would not tread outside the bit of ground on which I was working. It is very fine for small-scale work of that sort. I have gone round artichoke plants with it in the spring, going in and out between the plants. It could be used between rose trees. It is, of course, basically too small for anything except use by a private gardener who wants to do just what he can in the evenings, and it certainly is not a tool for the professional market gardener, who usually wants something bigger and more orthodox.

There is also a rotary electric hoe which I have not used enough to be able to say whether I am going to use one the whole time or not, but I know that there were occasions last autumn when I had not got one and wished that I had. I think that for greenhouse work it will probably come into its own.

Flame-guns have come to the fore very much during the last year. I have used a flame-gun intermittently for five or six years, and it did kill a certain amount of weeds in paving. But, at last, one manufacturer put it on wheels and gave it a hood; and now other manufacturers are doing the same thing. There is no doubt that it is very much hotter under a hood and it really does kill the weeds; moreover, you can run it along a grass edge without burning the grass.

There is another tool in which many people may be interested. For spraying selective weed-killers people tend to buy a motor pump or something of that sort. I cannot help feeling that a pneumatic knapsack with a hand-held boom is much safer, although as far as I know this is seldom used.

THE CHAIRMAN: I think there are one or two fundamental things that we should note. A lot of people today are confusing gardening with navvying. These chaps who come to the office on a Monday morning with aching backs and who, when you ask them what is the matter with them, say that they have been gardening, have been doing no gardening at all; they have been doing unskilled navvying, for which they were not physically suited. Gardening consists of pruning, raising seedlings, propagating cuttings, and so on; and in this day and age we should sub-let the navvying to a navvy or to a machine.

That is what our two speakers have been saying, and that, I feel, is the complete answer to the future of gardens as we know it today. In twenty years' time there will be no gardeners like FRED STREETER left, and all you will have to help you in the garden will be unskilled navvies. We shall have to be the gardeners and leave the navvying to the machine or to the odd-job man.

ALIC GRAY did not mention automatic ventilation regulation, but I have taken this year's chrysanthemums right through from 1st October until now completely untouched by hand so far as heat and ventilation were concerned.

It is surprising how much time you can waste hauling hose pipes from one end of the garden to another. This is the age of plastics in the house and plastics in the garden—and electricity, too, in the garden. I expect that in twenty years' time ALIC GRAY will tell you that when the house is wired for electricity the garden should be wired also. Nowadays, with plastic piping, you can yourself lay out water all over the garden, without bringing in a plumber to do it. We have a plastic ¾-inch main buried the whole length of the garden two or three inches underneath the ground, and it does not burst even in frost; if it freezes, it expands a bit and then contracts. You can couple it up yourself. You get a hose union from the garage and a jubilee clip and a screwdriver, and you can make the joint anywhere you like by yourself. You can take off from it legs and sprinklers, and so on, and with one turn of the valve you can water any part of the garden. That may sound very Utopian, but it does save a lot of trouble.

At home we have two types of sprinkler. One of them costs five bob, and there is nothing to go wrong about it. It throws a good fine spray about three yards' radius and six yards' diameter. Then there is the square rainer, which waters a square. It does not sound very important to water a square as opposed to a circle, but it is very helpful if you go one stage further and fix your irrigation system so that you can put fertilizers through it. There is another machine which is like a round container with a nozzle or outlet from the top and an inlet at the bottom. You screw the pipe into the bottom and screw the hose-pipe leading to the sprinkler out of the top. Then you measure the area to be covered by the sprinkler. If you want to put a quarter of an ounce of fertilizer to the square yard, you shoot so many quarter ounces of solid fertilizer into the container, turn the water on, and as soon as the water coming out stops being green, you know that the fertilizer has been put on equally all over the garden or lawn. Another point about the square rainer is that with it you do not get the overlapping of the circles when you move the sprinkler from place to place. These machines are now being sold for about £4 10s.

In a market garden you have the long aluminium spray lines with fine nozzles oscillating and turning nicely from right to left. You might think that in a long rectangular private garden it would be economic to put one of those in and leave it there permanently—but it is not; it is

too expensive. It is only worth while having this sort of thing if you can move it from one plot to the next and then come back at the end of the week and go over the plots again. You can have in a garden of irregular shape two or three kinds of plastic pipe with small fine holes in it which you can lay out permanently at the beginning of the season in your borders. They will water borders 10 feet wide with a very fine spray, and you can turn them on and leave them on for half an hour—and in this way you can do the watering without getting yourself dirty.

Those that we have can be run on an ordinary water pressure, and they are in about 25-foot lengths. You do not want them much longer than that. I have 57 feet as the longest length, and that is all right on a pressure of 60 lb. But most water pressures are about 30 lb. You can have more than one length coupled up to the same main, but if you have a long length you want more pressure.

For rock gardens, if you bury the plastic pipe half an inch under the soil you can get some very nice fine spray nozzles to put over the rock garden. You can put them down and leave them there and forget all about them, without worrying about frost.

Selective weed-killers also come into the labour-saving category.

With regard to hand tools, I do not think there has been any advance in the design of hand tools for the last 120 years. There has, however, been an advance in the materials used to make them—stainless steel, tubular handles, rubber grips, and so on; but the only tool that shows any ingenuity of design that I can think of is the new hoe, which looks rather like a golf club, with a stainless steel blade. This is a beautiful tool to use.

If you have ever had a stainless steel spade, I do not think you will be parted from it. Then there is the stainless steel edging iron—you buy one once in a life-time. The long-handled shears are good, too. If you are equipping yourself with tools, it is well worth getting rust-resisting or stainless steel secateurs, cutting tools, edging machine, trowel, fork, and so on. The point about them is that if you have not time to clean them, or the gardener forgets to clean them, it does not matter—they will clean as well tomorrow as last night.

Staking and tying, take a lot of time. Of course, you can choose your plants as my father did; he would not have a plant in the place that required staking and yet he had a very nice border. If you are staking and tying, just take a look round, and you will be surprised how many things you can get to help you. You can carry a pocketful of wire rings for sweet peas. You can do the job with a couple of these wire rings. Nowadays you can get those very nice paper-covered wires cut to length that just twist round a plant. The neatest thing that I have seen this year was invented a year or two ago by the first master at Charterhouse, who made it himself, and we persuaded a manufacturer to make them. It consists of two halves of a wire ring with a sleeve of plastic tube round it. You can put them over strawberry plants or dwarf tomatoes. It has two legs and the circle of plastic-covered wire. You put it so that the

strawberry fruits lean over the wire; the fruits are kept from the soil and the damp and the slugs, and you get a very good crop of strawberries. The strange thing is that our strawberries growing on paper mats, bark fibre or straw were all attacked by the birds, but those perched over these wires were left alone by the birds. Whether it was awkward for the birds to peck upwards at the strawberries instead of pecking down, or whether the birds thought that the black plastic going through the outer leaves was a kind of snake, I do not know. We did not lose a single strawberry from the plastic-supported plants.

Of flame-guns, there was one point that SIR WILLIAM did not mention. I think that the future for the flame-gun lies not so much in weed-killing and control, but as a hygienic weapon in the garden. If you will take the trouble when you have cleared a crop to run over the land with a flame-gun, think what it is doing to the pest eggs, disease spores and weed seeds on the surface. If we do that for a few years, I cannot believe that we shall not give ourselves a lot of freedom from trouble in the future.

Then there are automatic sieves: I do not know of anything that grieves me more than to dissipate my hard-earned calories by having to sieve soil. To struggle with a sieve is very hard on the stomach muscles! An automatic sieve is very useful.

Driving in canes is a tiresome job: There is a cane driver that you slip over the top of the cane and it will drive in the cane. There is the same sort of thing for driving in posts.

Well, these are a few of the things that one can get to save labour. But I do think that all of you must develop a kind of suspicious mind about the garden. Every time you go out, look at every job you do and say, "Is there any way of dodging this job, any way of getting it done more quickly? Can I rearrange things so as to get over this terrible, recurrent problem? Is there anything I can do to get out of the hard work and make things easy, make me enjoy gardening more and give more time for the real gardening?"—which, as I said at the beginning of my remarks, is not navvying.

Question: What are your feelings about using bark fibre as a labour-saving device?

THE CHAIRMAN: For many things we now believe that it is better for the garden than peat is, because it lasts longer, it does not decompose and disappear as quickly, and the fibres, being all at different angles and not flat down like peat, let in more air and more carbon dioxide out, thus giving better aeration. It is also half the price of peat. It is delivered within 25 or 30 miles of London at £7 10*s.* a ton. We use it all over the garden. We cover the whole place in the spring an inch or two deep. We do not do hoeing. The weeds will come up through it, but it is always moist underneath, and you can pull out the weeds with your hands. We like it very much because it is cheap and labour-saving.

We do not make enough use of mulches. We forget to put them on until it is too late. Do not put the mulch on before the end of April, because if you do it just keeps the soil cold; wait until the soil has begun to warm up, which is at the end of April, and then put on the mulch; you will then get much better crops, because it will keep in the moisture, and you will have much less trouble in keeping the weeds down.

THE NAME OF BATTLESTON HILL, WISLEY

R. N. Bloxam

BATTLESTON—to use the form in which it has appeared on the 6-inch Ordnance map from 1872 on—lies on the north-west side of the London-Portsmouth road. "Battleston(e) Hill" and "Furze" also appear in the Wisley Tithe Award (1842) (1), but this is no guarantee of accuracy, and the local form of the name, at least among older inhabitants, is *Bottleston* or *Bodystone*; the latter is the form used on the 1-inch Ordnance map of 1816. In a copy of the Court Roll for the manor of East Horsley for 1779, now in Guildford Muniment Room, a certain holding in the parish of Ockham (which adjoins Wisley) is described as "lying near Bottlestone Hill", and the same form is found on a manuscript map in the British Museum dated 1756 (2).

In actual fact, however, the hill had nothing at all to do with battles, bottles, bodies, or stones! On the Wisley Glebe Terrier for 1696—now in Southwark Public Library—some of the rector's land is said to be partly bounded on the south by Bottles*down*, which fixes the true form of the last syllable. For an earlier mention of the hill we have to go back more than three centuries. Under the year 1355 it is stated in the Black Prince's Register (3) that he "has granted 20 acres on *Bodlesdoune* to Sir Andrew parson of the church of Wisley": this is ANDREW BEKENSFELD who was instituted rector in 1348 or 1349. The form here found is the only one other than Battleston(e) recorded in the Place-Name Society's volume, but there is apparently a still earlier reference to the hill in an unpublished document in the Public Record Office dated 1206 (4). This records one of those fictitious lawsuits by which land used to be conveyed, and concerns the purchase of the manor of Wisley by one John de Brius (Brewes); certain lands, however, are expressly excepted and these include "in *Bolesdone* 11 acres towards the west".

Now if this is the same hill as the "Bodlesdoune" of 1355 the "d" in the latter form may be what is called "intrusive", and the hill may have derived its name from the surname Bol or Bolle which is not uncommon in the district. But it is tempting to think that the form *with* the "d" is more correct. "Botl" is Old English for a "dwelling"; Bootle in Lancashire is derived from this word, and on the map of 1756 already quoted, the well-known Hut Pond—on the main road half a mile north-east of

our hill—is called Bootles Pond. It looks then very much as if the lake, called Bolder Mere on the Ordnance Survey, was originally *Bodlemere*, and that both lake and hill took their name from a "hut" or hostelry that lay—perhaps nearer to the hill than the present Hut Hotel opposite the lake—on what was and still is a particularly lonely stretch of road; there are records of murders committed on it both in the thirteenth and seventeenth centuries. (Note that the Hut Hill of modern maps, lying north of the lake, is quite distinct from the hill whose name we have been discussing.) (5)

In conclusion, the hope may be expressed that the form "Bottlestone" may one day be restored to the map, for it is at least nearer to the original form, and has not the falsely romantic implications of "Battlestone".

REFERENCES

(1) *The Place-Names of Surrey* (Camb. Univ. Press, 1934).
(2) *Survey and Sketch of the Road from Camberwell to Guildford*, by LIEUT. DUNDAS (Royal Maps, VI, 104); for information as to this map I am indebted to my friend, MR. T. E. C. WALKER.
(3) (H.M.S.O.) Part IV, p. 148.
(4) The reference is C.P. 25(1)/225/3 (Feet of Fines, Surrey, no. 18).
(5) I have just read in Ivor Brown's *Balmoral* (London, 1955), that the "bothie" where Queen Victoria and the Prince Consort stayed in the course of their expeditions was commonly known as "The Hut".

TREE PLANTING BY THE LONDON COUNTY COUNCIL

L. A. Huddart

(*Chief Officer L.C.C. Parks Department*)

THE ever-increasing spread and development of building areas in recent years has brought a greater awareness of the aesthetic and amenity value of our national heritage of trees, and in particular of forest-type trees which form one of the glories and distinctions of our landscape. It is recognized that trees can contribute to our pleasure and to the general amenities in both town and country, and this is emphasized by the provision of powers under the Town and Country Planning Act, 1947, for the preservation of trees and woodlands.

The London County Council has a heavy responsibility not only as a local authority but also as a great landowner, within and outside its administrative area. We are mindful that our generation enjoys the fruits of past care and foresight, and that we in turn must provide for the future.

It will be appreciated that in an area of over 7,000 acres of parks and open spaces the war damage to trees, though not always apparent, was

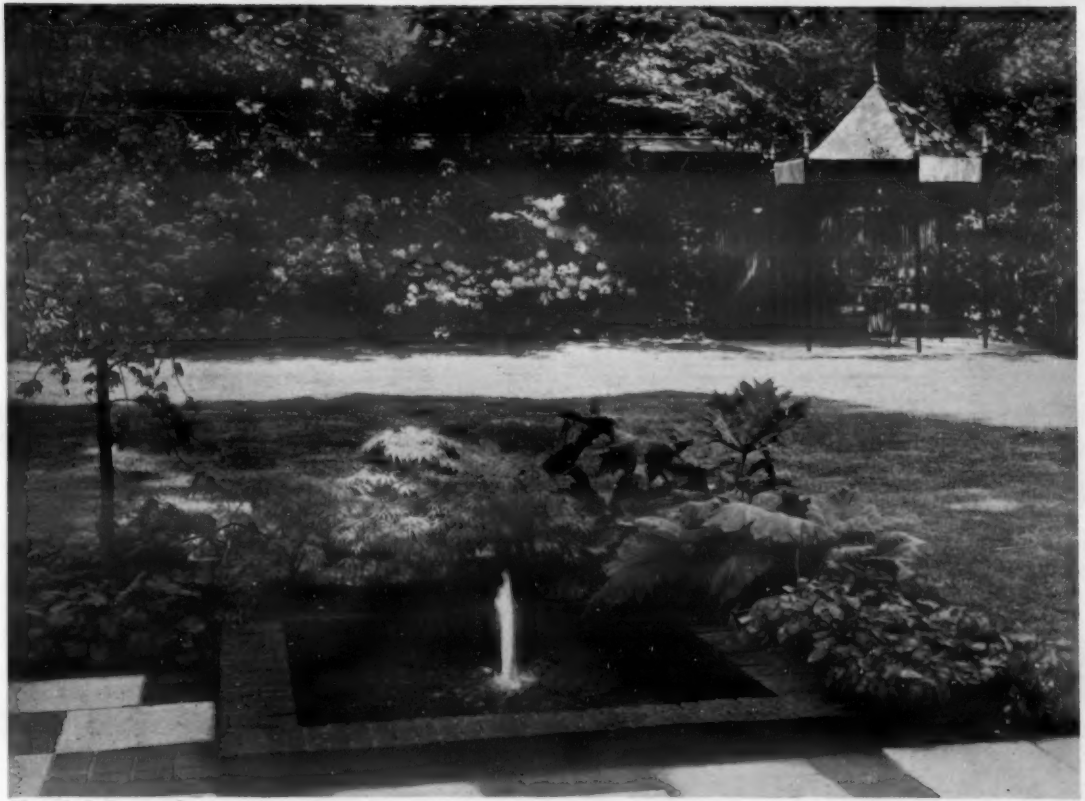
Photo, J. E. Downward

FIG. 94—*Smilacina racemosa*, **F.C.C.** May 22, 1956. Shown by Commissioners of Crown Lands, Windsor Great Park (See pp. 364 and 369). A fine plant for the woodland garden

Photo, J. E. Downward

CHELSEA SHOW, 1956

FIG. 95—Rock garden exhibited by Messrs. Gavin Jones Ltd., Letchworth, for which a Gold Medal was awarded



Photo, J. E. Downward

FIG. 96—Formal garden exhibited by Messrs. Wallace & Barr, for which a Silver-gilt Flora Medal was awarded

Photo, J. E. Downward

FIG. 97—Part of an exhibit of plants for the woodland garden exhibited by the Commissioners of Crown Lands, Windsor Great Park, for which a Gold Medal was awarded. On the left is a plant of *Rhododendron yakusimanum*

Windsor Great Park, for which a Gold Medal was awarded. On the left is a plant of Rhododendron *yakusimanum*

Photo, J. E. Downward

FIG. 98—Part of an exhibit of greenhouse plants shown by MR. L. MAURICE MASON, of Talbot Manor, Fincham, for which a Gold Medal was awarded. In the centre is a large plant of *Cycas revoluta*

FIG. 99—Rock garden exhibited by Messrs. G. G. Whitelegg, for which a Gold Medal was awarded

Photos, J. E. Downward

FIG. 100—Rock garden exhibited by Old Welwyn Gardens, for which a Gold Medal was awarded

FIG. 101 — *Angulocaste* (Apollo *g.*) 'Goldcourt' **F.C.C.** May 22, 1956; exhibited by MISS BETTY COOKE, Newbury (See pp. 365 and 370)

Photos, J. E. Downward

FIG. 102—*Brassavola perrinii*. An unusually fine pan of this orchid was shown by the Director, Royal Botanic Gardens, Kew, for which a Certificate of Cultural Commendation was awarded (See p. 365)

Photos, J. E. Downward

FIG. 103—*Halesia carolina* **A.M.** May 22, 1956, exhibited by MAJOR A. E. HARDY, Hythe (See pp. 365 and 369)

FIG. 104—*Endymion* (*Scilla*) *hispanicus* 'Chevithorne' **A.M.** May 22, 1956, exhibited by Commissioners of Crown Lands, Windsor Great Park. An unusually fine form of this plant (See pp. 365 and 369)

widespread. This, in addition to the enforced neglect of tree-work during the war and the difficult years that followed, provides a very big task.

The extent of the woodland areas in the Council's care, apart from commons and ornamental parks, is about 1,200 acres. The different wooded areas have their own peculiar characteristics and ecological problems derived from differences in soil and district, which in addition to plant, bird, animal and even insect life (being closely related) must be fully considered in any scheme for the improvement of these areas.

Bostall Woods and Lesnes Abbey Woods, situated on the gravel plateau overlooking Erith Marshes, together comprise over 250 acres of mixed woodland. These woods have been in existence for hundreds of years and are believed to have been composed originally mainly of oak with an oak-birch-heath association. They were managed primarily as a source of fuel and timber for agricultural use, and during mediaeval times, or possibly earlier, sweet chestnut was introduced on a wide scale for coppicing; this was particularly so in the Lesnes Woods where the abbey was the centre of a thriving community. Since the eighteenth century a wide range of trees has been introduced. This is most noticeable in the west sector of Bostall Woods, where many diverse conifers and ornamental trees have been planted. The conifers (*Tsuga*, *Abies*, *Larix* and *Pseudotsuga*) were introduced in about 1906 when a serious infestation by the pine beetle necessitated the removal of many pines of all age groups. During 1909, an extensive drift of beech was planted.

Bostall Woods extends to the southern and western slopes of Bostall Hill. These slopes, which are deeply scored by miniature gorges, are well timbered with oak, ash, birch and sweet chestnut, the dominant undergrowth being holly. The character of the plateau area has been radically changed by the introduction of trees alien to the true oak-birch association of this particular area. There is, however, a strong natural regeneration of English oak and birch in most areas which will be encouraged in conjunction with a programme of selective thinning over a number of years. This programme will aim at the elimination of the more recently introduced foreign trees, a number of which are already dying out due to adverse soil conditions. There has been a marked tendency during the past to plant trees in plantation fashion, and during 1909 an extensive area of beech was regularly planted at very close intervals. These trees are now much too close to permit free development, and a thinning will be carried out now and again in later years as the trees continue to develop. On the north side the land is much more open, consisting of bracken and gorse heathland, sparsely wooded with birch and young oak, and here there is free natural regeneration.

Lesnes Abbey Woods comprises two main wooded areas. Of these, the Hurst Wood and Banks Wood are mainly oak and sweet chestnut, with birch and ash sub-dominant. Here natural regeneration is free and vigorous, and maintenance presents few difficulties. The larger, gently

Lands, Windsor Great Park. An unusually fine form of this plant (See pp. 365 and 369)

undulating area of Boarer's Wood consists of coppiced sweet chestnut with well-developed oaks dominating the tree canopy; there are also localized areas where the tree population extends to birch, ash and elm. Within this main area are three enclosures containing naturalized daffodils (*Narcissus pseudo-narcissus*) and other woodland flowers. This feature is unique, and might very well be destroyed by indiscriminate planting. The balance between tree canopy and ground flora is fine, and any new planting will call for considerable skill to build up and retain the lightly wooded character of the area, enhancing at the same time the charm of this delightful setting.

Castlewood, Jackwood and Oxleas Wood together form an extensive and reasonably well timbered region on the south side of Shooter's Hill Road, and with other public and privately owned areas contribute a wide belt of woodland and common land extending southwards from the Thames estuary into North Kent. In Castlewood, the dominant tree is oak, interspersed with other hardwoods of more recent introduction, although in the vicinity of certain man-made ornamental features, a wide range of deciduous and coniferous trees has been introduced. The oaks are well represented in all age groups, but there is a noticeable absence of very old prime oak. With selective thinning, some re-planting, removal of dead wood and the elimination of seedling sycamore, the wood can be maintained in a good state of preservation encouraging at the same time natural regeneration. Jackwood, too, should only require the removal of dead wood and selective thinning, together with the preservation of natural regeneration. Here also oak is predominant, although towards the upper levels drifts of birch are established. Oxleas Wood is an area of over 200 acres of pure woodland intersected by woodland walks. Once more oak is the main genus, though birch is well represented, and ash is present at the lower levels. In this wood the scrub growth and influx of seedling and sapling sycamore will be reduced.

The heathland and woodland areas of Hampstead Heath and Kenwood cover 418 acres, of which 136 acres comprise the two woods and adjacent parkland of Kenwood. The Kenwood area is a most important link with the old Middlesex forest belt. The woods are mainly of beech and oak, some of which have fallen and left unsightly gaps, while others will not last many more years. There is some natural regeneration of beech in the north wood, and this, with care in thinning and the removal of seedling sycamore, will help to perpetuate the trees in various age groups. In the south wood, which consists mainly of oak with some beech, a careful and controlled thinning programme is needed, followed by selective planting of young stock of various ages. This work will be spread over a number of years, and be carried out with due consideration for the preservation of the basic Middlesex forest character, with some natural undergrowth retained to provide facilities for local bird life wherever possible. On the sandy heath and west heath, areas of seedling sycamores need to be cleared to help the

growth of natural vegetation and, to restore sites so cleared to their natural condition, suitable plant subjects should be introduced. New trees typical of the area will be planted to supplement stock, which is now almost exhausted or fast dying out. Elsewhere on the heath there is need for the control of excessive growth of sycamore, and for further plantings of more suitable trees and bushes to maintain the natural ecological conditions of Hampstead Heath and its value as a natural open space.

The wooded area of Hainault Forest extends to some 250 acres, and, along with adjacent areas now valued as an open space and for agricultural purposes, formed part of the ancient forest of Essex. The woodland areas consist in the main of hornbeam, which was regularly pollarded for the production of timber until about twenty years ago. There is scattered interplanting of oak throughout, and a thick undercover of holly, all of which appears to have become established over the past twenty years. Ash predominates in a small area and plantations of birch have appeared more recently on certain open sites. The hornbeams are old, and some are gradually dying out, although there is a certain amount of natural regeneration of seedling oak and hornbeam which should, if properly handled, help to maintain a succession of trees in various age groups. The rough scrub area on the outskirts of the forest shows a good regeneration of oak which with correct management will serve to maintain the forest areas for some years.

Since the war a certain amount of reinstatement work with limited new planting has been carried out, but its scope has of necessity been limited, and in consequence some areas of open land have become rough or very sparse in trees or plants. In many instances the woodland areas are seriously overgrown with seedling sycamores and foreign evergreen and deciduous undergrowth, only by reducing the competition from this alien undergrowth, and by creating areas for replanting with new plants typical of the areas will it be possible to recreate healthy and vigorous woods. Similarly in the open areas adjoining these woodlands, where trees and shrubs should be part of the landscape of natural vegetation, judicious planting will be made to re-create conditions so valuable as a sanctuary for bird and animal life.

The planting of trees in parks over recent years has barely kept pace with removals. The Department has a total of 2,258 acres devoted to ornamental parks, of which a considerable area is devoted to sports facilities and, in consequence, the planting of trees has to be considered in the light of the demands of these facilities.

It can be truly said that many lines and avenues in the parks were intentionally either close planted or planted with "filler" trees with the full understanding that removal of certain trees would be undertaken as the trees developed. This is a recognized and praiseworthy practice, providing, of course, that it is accepted that certain trees are to be removed in due course to give room for full and natural development of the remaining trees. Since 1947, certain thinning by the removal of these

"filler" trees has been carried out, but many lines are still too close, and thereby expensive to maintain. Thinning must be carried out to allow these trees to become healthy well-grown specimens and to give the best possible effect with the minimum expense in maintenance.

It is still felt that operations of this nature give a positive improvement to the existing tree population, and if the removal of "filler" trees is carefully countered by new planting about the parks, a much more interesting and greatly extended range of tree age groups will enhance these areas for the future.

Apart from the special woodland areas the total number of trees to be planted each year in the parks and open spaces, in addition to replacements, will be about 700, and this programme will extend over ten years. Whilst the greatest emphasis will be given to the planting of British species, it is felt that within these mainly ornamental parks, there is opportunity for, and certainly little objection to, the introduction of other subjects from the New World and elsewhere.

The ornamental flowering tree would not be entirely neglected, for the range and choice of subjects is such that a place can always be found for them. It is, however, to be appreciated that the lives of many types of flowering trees are of short duration. A life of thirty-five or even fifty years may be regarded as transient when considering a planting programme planned for effect in the 150 to 200 years which could constitute the life of a good oak or plane.

Unfortunately the conditions do not lead to favourable consideration of coniferae. Few areas can be said to support conifers really well, but certain parks will be planted with conifer species as the scheme progresses. The Scots pine will have its site, as will the cedar and swamp cypress, for indeed, where such subjects already thrive we deem it a duty to perpetuate them by planting trees of the same type nearby.

The remaining area of approximately 3,620 acres of commons and open spaces necessitates a further modification to the general planting programme, for as in the case of woodlands, the choice of subject and the method of planting calls for special attention. On true common areas it would be unwise to perpetuate the method of planting in lines as these areas are in the main ideal for the planting of truly British trees in groups and also individually.

Some open spaces have been man-made, and will be planted as nearly as possible to conform with the character of the neighbourhood in accordance with such records as may be available. Some areas are already lined out with trees, and careful siting of groups and single trees is of great importance for the future; many of the lines of existing trees are of a similar age group and in the course of time will tend to die together.

It is hoped by carrying out this programme of planting and care that future generations of Londoners will receive an inheritance not diminished by neglect or misuse, but preserved and enhanced by all the resources of modern arboriculture.

The Council's tree planting schemes will cover the following species and varieties:—

PARKS AND OPEN SPACES

Acer sp. and vars.
Aesculus hippocastanum fl. pl.
Aesculus sp. and vars.
Ailanthus glandulosa
Alnus sp.
Amelanchier sp.
Betula sp. and vars.
Carpinus sp. and vars.
Castanea sativa
Catalpa sp.
Celtis occidentalis
Crataegus sp. and vars.
Fagus sp. and vars.
Fraxinus sp.
Ginkgo biloba
Gleditschia triacanthos
Juglans sp.
Liquidambar styraciflua
Liriodendron tulipifera
Magnolia sp. and vars.
Malus sp. and vars.
Morus sp.
Nothofagus sp.
Nyssa sylvatica
Parrotia persica
Paulownia sp.
Platanus sp.
Prunus sp. and vars.
Pterocarya sp.
Quercus pedunculata
" *robur*
" *sessiliflora*
" sp. and vars.
Robinia sp.
Salix sp.
Sophora japonica
Sorbus sp. and vars.
Tilia sp. and vars.
Ulmus sp. and vars.
Zelkova carpinifolia

COMMONS

Acer campestre
Alnus glutinosa
Betula pubescens
" *verrucosa*
Carpinus betulus
Crataegus monogyna
" *oxyacantha*
Euonymus europaeus
Fraxinus excelsior
Ilex aquifolium
Prunus avium
" *insititia*
" *spinosa*
Quercus robur
Rhamnus frangula
Salix caprea
Ulmus procera

WOODLANDS

Betula verrucosa
Carpinus betulus
Castanea sativa
Crataegus monogyna
Fagus sylvatica
Fraxinus excelsior
Prunus avium
Quercus robur
Sorbus aucuparia
" *torminalis*
Ulmus procera

PLANTS AND PROBLEMS—XXVI

VEGETABLES TO SOW IN AUGUST

Question. Please could you tell me the correct time to sow, in the autumn, onions and cabbage for spring hearting.

Answer. Onions should be sown during August for planting out in March of the following year. It is usual to make two sowings, one about August 10 and the other about August 20. The idea of two sowings is to provide plants of two sizes in the spring and thus have a choice at planting time in case one batch is too large. In order to avoid attacks of onion mildew the site for sowing should not be sheltered or in a low-lying position. The seed should be sown at the rate of ½ ounce to 40 feet of row. The rows should be spaced 15 inches apart.

The advantages of autumn sowing are:

(1) There is less chance of attacks by onion fly.
(2) The bulbs ripen earlier and so are easier to harvest.
(3) Weed control is easier.

Suitable varieties for autumn sowing include:

Giant Zittau
Reliance
Solidity
Autumn Queen

Cabbages for spring hearting should be sown during the first week of August in rows 1 foot apart. The resulting plants should be set out during September on land which has been used previously for such crops as potatoes and peas. It is not advisable to apply organic manure to the ground as it is liable to encourage sappy growth. If the land is in good heart no artificial manure is necessary, but if it is on the poor side apply a dressing at the rate of 4 ounces per square yard of sulphate of potash and superphosphate of lime mixed in equal proportions. In the spring give a top dressing of nitro-chalk at the rate of 1½ ounces per square yard.

Harbinger Wheeler's Imperial	planted 20 inches by 15 inches
Durham Early Early Offenham	planted 24 inches by 18 inches

APPLES AND PEARS—SUMMER PRUNING

Question. I have read numerous and varying accounts of how apples and pears should be summer pruned. Can you please quote one simple method I can apply, most of my trees being of the bush type.

Answer. Probably the most straightforward method of summer pruning for apples and pears is that known as single long summer pruning. This consists of cutting back all young shoots (except leading

shoots) over 9 inches in length to about 5 inches. The time for doing this varies with season, area and site, but approximately it is late July for pears and about two weeks later for apples. The best guide is to prune those shoots that have turned brown and woody at the base, cutting back the remainder if and when they reach a similar stage. The leading shoots of each branch on bush trees and in most other forms of tree must not be summer-pruned, but should be tip-pruned in winter, at the same time shortening the summer-pruned shoots where necessary. Summer pruning is most useful on trained trees of a restricted form, but is also beneficial on bush or standard trees, etc., where practicable.

FEEDING A LAWN

Question. My garden is on poor sandy soil and although I have worked hard to improve the lawn the grass looks very poor and weeds persist. Would a top dressing be worth the amount of labour involved? If it is worth while, please how do I make the compost as I have not a deal of animal manure available.

Answer. Undoubtedly, a top-dressing would be well worth while and, indeed, it is one of the principal means of obtaining good turf although the practice is, regrettably, not done as much as it might be by gardeners.

To make the compost, a heap should be built during the spring. This is done by stacking alternate layers, about 6 inches deep, of loamy soil and organic matter on top of each other. For the latter ingredient, animal manure is ideal and limited supplies can be supplemented with well-rotted garden compost, peat, leaf-mould or sewage sludge. Usually some coarse materials like sharp sand or ashes are also used but this will not be necessary on a light soil.

Early in the following spring the compost can be put through a riddle and then applied at a rate of 5–7 lbs. per square yard. In addition, a dressing of sulphate of ammonia is usually added after the compost is riddled, to give 1 ounce of the sulphate per square yard.

STEM-BORING CATERPILLAR

Question. The enclosed insect was found in the stem of a chrysanthemum plant. Can you tell me what it is and how I can prevent it from infesting the rest of the plants?

Answer. The caterpillar tunnelling in the stem of the chrysanthemum plant was that of the Frosted Orange Moth, *Gortyna flavago*. It normally feeds on weeds such as burdock, mullein, figwort, thistle, etc., but occasionally such garden plants as foxglove, potato and chrysanthemum are attacked. When fully fed, the caterpillars pupate inside the stem and in due course, the small gold and brown moths emerge. The eggs are laid on the stems of the host plants.

This insect is only an occasional pest and rarely occurs in sufficient numbers to cause serious losses. Affected shoots should be hand-picked and burned.

PEST OF WATER-LILIES

Question. The leaves of my water-lilies are being attacked by some pest which feeds on the leaves, causing them to decay. I found a small brown beetle on one of the leaves. Would this be responsible for the damage?

Answer. The pest attacking your plants is the Water-lily Beetle, *Galerncella nymphaeae*. There are two generations of this insect each year, but as considerable overlapping occurs, all stages, eggs, larvae, pupae and adults, may often be seen on a single leaf at one time. The eggs are laid in small clusters on the upper surface of the leaf. From these the small, dark brown larvae emerge. At first they feed on the surface tissue of the leaf, but as they increase in size they eat away portions of the leaves and petals. When fully fed, they pupate on the leaf and the adult beetles emerge about ten days later.

If there are no fish in the pond, the plants may be sprayed with Nicotine or HETP at normal dilutions.

If fish are present we advise syringing the leaves forcibly with water to dislodge the larvae. Alternatively submerging the leaves by raising water-level or depressing the plants by means of iron hoops for a few days will give the fish an opportunity to consume the larvae.

NOTES ON SOME PLANTS WHICH RECEIVED AWARDS AT CHELSEA SHOW

Smilacina racemosa

A FIRST CLASS CERTIFICATE was awarded to *Smilacina racemosa*, a woodlander with stem and leaves rather like a Solomon's Seal but crowned with a feathery white conical inflorescence. A grand plant for damp shady places. Exhibited by the Commissioners of Crown Lands (Fig. 94).

Paeonia × '*Emma*'

This charming early-flowering herbaceous paeony, which received an Award of Merit, was raised by SIR FREDERICK STERN from *P. emodi* crossed with pollen from *P. mascula*. In appearance it leans more to *P. emodi* having white flowers faintly flushed with pink at the base of the petals only. A welcome recruit to the ranks of single "species" paeonies.

Phyllodoce breweri

This heath-like ericaceous shrublet is a valuable subject for the limefree rock or heath garden or for a pan in the alpine house. It bears dense spikes of Dianthus Purple (H.C.C. 732/2) flowers which all are open at the same time which adds greatly to its charm. Exhibited by SIR HENRY PRICE, Wakehurst Place, Ardingly.

Endymion (Scilla) hispanicus 'Chevithorne'

The form of the Spanish bluebell grown in the Windsor Great Park is of exceptional stature and quality. Whether it is a tetraploid or even perhaps a hybrid (for its bells have somewhat of the loose drooping habit which is one of the charms of the common bluebell) is for the scientifically minded to say, but it is clear that it is no common Spanish bluebell and so must be named to distinguish it from the type (Fig. 104).

Halesia carolina

MAJOR HARDY showed a very good form of the well-known snowdrop tree which many of the older gardeners still think of as *Halesia tetraptera*. The hanging white bells spring from the nodes of the branches somewhat after the fashion of a Judas tree and a well-flowered specimen is a lovely sight. Happiest in conditions that suit the rhododendron and camellia (Fig. 103).

ORCHIDS

Angulocaste (Apollo g.) 'Goldcourt'

Angulocaste 'Apollo' is a very remarkable and handsome bigeneric hybrid obtained by crossing the golden-yellow *Anguloa clowesii*, a Colombian species, with *Lycaste imschootiana*. The Wyld Court variety gained an Award of Merit when exhibited by DR. W. STIRLING on March 22, 1955, and the variety 'Goldcourt' was awarded a First Class Certificate at this year's Chelsea Show, where it was exhibited by MISS BETTY COOKE, Wyld Court, Hampstead Norris, Newbury.

The large flowers, of great substance, are borne singly on stout 6-inch stems and in this new variety they are deep yellow, whereas *A.* 'Apollo' is chrome or lemon yellow. Minute red dots appear on the sepals of the variety 'Goldcourt', and there are red markings on the insides of the smaller petals, while the yellow lip is heavily marked with red-brown. Well-grown plants of *A.* 'Apollo' may carry from three to five very attractive and long-lasting flowers (Fig. 101).

Brassavola perrinii

No one would describe *Brassavola perrinii* as a showy or brilliant orchid. Nevertheless, it has a quiet beauty that is particularly noticeable when it is grown as a large specimen such as the one shown at

Chelsea Show by The Director, Royal Botanic Gardens, Kew, which carried several dozens of flowers. This Brazilian species, with its short pseudo-bulbs, is an orchid likely to make a great appeal to amateurs with modest accommodation, as it flowers with great freedom. The sepals and petals are narrow, pale green, but the main attraction is the comparatively large, pure white lip that is sometimes tinted with green at the base. The Certificate of Cultural Commendation awarded to the Kew plant was thoroughly merited. *B. perrinii* is best grown in pans in what plantsmen speak of as an intermediate temperature (Fig. 102).

WISLEY TRIALS 1956

NARCISSI

A sub-committee of the Narcissus and Tulip Committee inspected the trial on April 12 and 25, 1956 and on its recommendation the Council of The Royal Horticultural Society has made the following awards to Narcissi as varieties for garden decoration.

The number in brackets after the description of the variety is that under which it was grown in the trial. Twenty-five bulbs of each variety were grown.

Division I—Trumpet Narcissi

(a) Perianth coloured; Corona coloured, not paler than the Perianth

BURGEMEESTER GOUVERNEUR. (Raised by Messrs. P. van Deursen, Sassenheim, Holland, introduced and sent by Messrs. Warnaar & Co. Ltd., Sassenheim, Holland.) **A.M.** April 25, 1956. Plant vigorous, foliage 13 inches long, erect. Flower stems 12 inches tall; flowers 4½ inches diameter, of good form; perianth segments 1⅞ inches long, flat, overlapping for one-half of their length, Dresden Yellow (H.C.C. 64/1); corona 1⅞ inches long, 2¼ inches diameter, slightly ribbed, mouth expanded, frilled with margin serrated and reflexed, Aureolin (H.C.C. 3). Flowering from April 12, 1956. Flowers in the first year twenty-seven and in the second year sixty-eight. [104]

INVICTA. (Raised by Mr. J. L. Richardson, Prospect House, Waterford, Eire, introduced and sent by Lady Haldin, Lympne Place, Lympne, near Hythe, Kent.) **A.M.** April 12, 1956. Plant vigorous, foliage 14 inches long, very erect. Flower stems 15 inches tall; flowers 4¼ inches diameter, of good form; perianth segments 1⅞ inches long, flat, overlapping for one-half of their length, Canary Yellow (H.C.C. 2/1); corona 2 inches long 1¾ inches diameter, slightly ribbed, mouth fully expanded, frilled with margin serrated and reflexed, Aureolin (H.C.C. 3). Flowering from April 3, 1956. Flowers in the first year twenty, in the second year fifty and in the third year seventy-six. [33]

JOSEPH MACLEOD. (Raised, introduced and sent by Messrs. Warnaar & Co. Ltd.) **A.M.** April 25, 1956. Plant vigorous, foliage 12 inches long, erect. Flower stems 13 inches tall; flowers 4¼ inches diameter, of good form; perianth segments 1⅞ inches long, flat, overlapping for one-half of their length, Canary Yellow (H.C.C. 2/1); corona 2 inches long, 2¼ inches diameter, slightly ribbed, mouth fully expanded, frilled with margin serrated, Aureolin

(H.C.C. 3). Flowering from April 3, 1956. Flowers in the first year twenty-five and in the second year fifty-seven. [105]

MILANION. (Raised, introduced and sent by Mr. Guy L. Wilson, The Knockan, Broughshane, Co. Antrim, N. Ireland.) **A.M.** April 25, 1956. Plant vigorous, foliage 12 inches long, erect. Flower stems 13 inches tall; flowers 4½ inches diameter, of good form; perianth segments 1¾ inches long, flat, overlapping for one-half of their length, Canary Yellow (H.C.C. 2/1); corona 1⅞ inches long, 2⅛ inches diameter, slightly ribbed, mouth fully expanded, frilled with margin serrated and reflexed, Aureolin (H.C.C. 3). Flowering from April 11, 1956. Flowers in the first year twenty-seven and in the second year sixty-one. [101]

(b) Perianth white; Corona coloured

PATRIA. (Raised, introduced and sent by Messrs. Warnaar & Co. Ltd.) **A.M.** April 12, 1956. Plant vigorous, foliage 12 inches long, erect. Flower stems 12 inches tall; flowers 4¾ inches diameter, of good form; perianth segments 2 inches long, slightly twisted, overlapping for one-half of their length, creamy white; corona 2½ inches long, 2⅛ inches diameter, mouth fully expanded, frilled with margin serrated and reflexed, Canary Yellow (H.C.C. 2). Flowering from April 3, 1956. Flowers in the first year twenty-seven and in the second year sixty-two. [108]

STRAIGHT. (Raised by Messrs. P. van Deursen, introduced and sent by Messrs. C. Gouverneur & Co.) **A.M.** April 12, 1956. Plant vigorous, foliage 14 inches long, erect. Flower stems 15 inches tall; flowers 4¼ inches diameter, of good form; perianth segments 1¾ inches long, flat, edges incurving, overlapping for one-third of their length, creamy white; corona 1¾ inches long, 1⅞ inches diameter, mouth expanded and frilled with margin serrated and reflexed, Canary Yellow (H.C.C. 2). Flowering from April 11, 1956. Flowers in the first year fifty-one and in the second year seventy-eight. [112]

(c) Perianth white; Corona white, not paler than the Perianth

BROUGHSHANE. (Raised, introduced and sent by Mr. Guy L. Wilson.) **A.M.** April 25, 1956. Plant vigorous, foliage 16 inches long, mostly erect some rather lax. Flower stems 16 inches tall; flowers 4⅜ inches long, of good form; perianth segments 1¾ inches long, slightly twisted, edges slightly incurving, overlapping for one-half of their length, creamy white; corona 1⅞ inches long, 1⅞ inches diameter, ribbed, mouth expanded and frilled with margin serrated and reflexed, creamy white. Flowering from April 16, 1956. Flowers in the first year twenty-seven and in the second year fifty-seven. [111]

CANTATRICE. (Raised, introduced and sent by Mr. Guy L. Wilson.) **A.M.** April 12, 1956. Plant vigorous, foliage 12 inches long, erect, freely produced. Flower stems 13 inches tall; flowers 4¼ inches diameter, of good form; perianth segments 1¾ inches long, flat, overlapping for one-third of their length, creamy white; corona 1¾ inches long, 1½ inches diameter, mouth expanded and frilled with margin serrated and reflexed, white. Flowering from April 10, 1956. Flowers in the first year twenty and in the second year seventy-two. [110]

Division II—Large-Cupped Narcissi

(a) Perianth coloured; Corona coloured, not paler than the Perianth

GOLDEN TORCH. (Raised by The Brodie of Brodie, introduced and sent by Mr. Guy L. Wilson.) **A.M.** April 12, 1956. Plant vigorous, foliage

18 inches long, erect. Flower stems 18 inches tall; flowers 4 inches diameter, of good form; perianth segments 1¾ inches long, flat, overlapping for one-half of their length, Canary Yellow (H.C.C. 2/1); corona 1½ inches long, 1¾ inches diameter, slightly ribbed, mouth expanded and frilled with margin crenate and reflexed, Lemon Yellow (H.C.C. 4). Flowering from April 10, 1956. Flowers in the first year twenty-three, in the second year forty-seven and in the third year seventy-five. [55]

BRIDGET HILL. (Raised by Mr. J. L. Richardson, introduced and sent by Mr. P. Lower, Chukwani, New Road, Teignmouth, Devon.) **A.M.** April 25, 1956. Plant vigorous, foliage 18 inches long, erect. Flower stems 16 inches tall; flowers 3¾ inches diameter, of good form; perianth segments 1⅝ inches long, flat, overlapping for one-half of their length, a light shade of yellow near Sulphur Yellow (H.C.C. 1); corona ¾ inch long, 1½ inches diameter, mouth slightly expanded and frilled with margin crenate, Persimmon Orange (H.C.C. 710) at mouth changing to Saffron Yellow (H.C.C. 7) at base of corona. Flowering from April 14, 1956. Flowers in the first year twenty-five, in the second year seventy-one and in the third year one hundred and five. [70]

Division IV—Double Narcissi

WHITE LION. (Raised, introduced and sent by Messrs. de Graaff-Gerharda, Lisse, Holland.) **H.C.** April 25, 1956. Plant vigorous, foliage 16 inches long, slightly lax. Flower stems 12 inches tall; flowers 3⅝ inches diameter, of good form; perianth segments 1½ inches long, flat, margin slightly incurving, creamy white; coronal segments 1½ inches long, ribbed, frilled, Straw Yellow (H.C.C. 604) deepening at edges of segments to Tangerine Orange (H.C.C. 9/1). Flowering from April 16, 1956. Flowers in the first year twenty-six and in the second year sixty-five. [137]

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1956

Narcissus 'Algeciras' A.M. April 1, 1956, as a variety for exhibition. A short-cupped bicolored narcissus of neat habit (Division 3B), with a flower 3 1/16 inches in diameter borne on a sturdy 18-inch stem. Its creamy white perianth segments were smooth, broad and overlapping, possessing a slightly reflexed habit. The margins of the segments were very slightly incurved, the outer being 1 1/16 inches long and 1 5/16 inches across. Its striking Orange (H.C.C. 12) corona was ⅜ inch long and 1 3/16 inches across at its expanded and crenate margin. The anthers were particularly large and conspicuous, being covered with very pale yellow pollen. Raised and shown by Mr. J. L. Richardson.

Narcissus 'Dallas' A.M. April 1, 1956, as a variety for exhibition. A small-cupped, self-coloured narcissus of particular whiteness (Division 3C), with a flower 3⅛ inches in diameter borne on a very sturdy 16-inch stem. The perianth segments had a slightly reflexed habit, the outer segments being 1 5/16 inches broad and 1⅜ inches long. The corona was ¼ inch long and 13/16 inch across at the evenly indented

margin of its expanded end. The base of the inner corona was distinguished by a $\frac{1}{16}$-inch-high pale green halo contrasting effectively with the pure white remainder. Raised by the Brodie of Brodie and shown by Mr. J. L. Richardson.

Narcissus 'Double Event' F.C.C. April 1, 1956, as a variety for exhibition. This outstanding bicolored double narcissus (Division 4) was raised and shown by Mr. J. L. Richardson. It received an Award of Merit as an exhibition variety on April 17, 1952, and was described in the R.H.S. JOURNAL, 77, 293.

Narcissus 'Home Fires' A.M. April 1, 1956, as a variety for exhibition. A well formed, richly coloured, large-cupped narcissus of good substance (Division 2A) with a flower $4\frac{3}{8}$ inches in diameter borne on a sturdy 21-inch stem. The Canary-Yellow (H.C.C. 2/1) perianth segments were broad and overlapping being very slightly incurved at their margins. The outer segments were $1\frac{3}{4}$ inches long and $1\frac{13}{16}$ inches across. The Marigold Orange (H.C.C. 11) corona was $\frac{15}{16}$ inch long and $1\frac{5}{8}$ inches across at its expanded and evenly indented margin. Raised and shown by Mr. Guy. L. Wilson.

Narcissus 'Kilmorack' A.M. April 1, 1956, as a variety for exhibition. This large-cupped narcissus was of neat and symmetrical appearance (Division 2A), possessing a bloom $3\frac{9}{16}$ inches in diameter borne on a stout 20-inch stem. The Sulphur Yellow (H.C.C. 1/1) perianth segments were smooth, of medium width and overlapping, having a slightly reflexed habit; the outer segments being $1\frac{3}{8}$ inches long and $1\frac{7}{16}$ inches across. The cylindrical corona was Tangerine Orange (H.C.C. 9) in colour, being about 1 inch long and $1\frac{3}{8}$ inches across at its indented and occasionally slightly incised margin. Raised by the Brodie of Brodie and shown by Mr. Guy L. Wilson.

Endymion hispanicus 'Chevithorne' A.M. May 22, 1956. This superior form of the Spanish bluebell, often grown under the name *Scilla hispanica*, is so named because the exhibitors obtained bulbs from the garden at Chevithorne Barton, near Tiverton. It has a bold raceme of large flowers coloured Wisteria Blue (H.C.C. 640) striped externally with French Blue (H.C.C. 43/1). Exhibited by the Commissioners of Crown Lands, Windsor Great Park, Berks. (Fig. 104).

Halesia carolina A.M. May 22, 1956. The "Snowdrop Tree" of the Southern U.S.A. makes a large deciduous shrub or small tree up to about 20 feet in height, with ovate or elliptic, acuminate leaves up to 4 inches long. In spring the long slender branchlets are wreathed with pendent bellshaped white flowers about an inch long in the best forms, opening a little in advance of the foliage. Exhibited by Major A. E. Hardy, Sandling Park, Hythe, Kent (Fig. 103).

Smilacina racemosa F.C.C. May 22, 1956. A very handsome North American herbaceous plant with erect or slightly arching stems reaching a height of 3 or 4 feet and bearing well-spaced elliptic, pointed and strongly nerved leaves about 6 inches long. The inflorescence is a dense terminal white-stemmed panicle, about 6 inches long, of small,

white, star-shaped, fragrant flowers, which are followed by red berries. Exhibited by the Commissioners of Crown Lands, Windsor Great Park, Berks. (Fig. 94).

Paeonia 'Emma' A.M. May 22, 1956. A very lovely herbaceous hybrid raised from the cross *P. emodi* × *P. mascula*. It has pure white flowers nearly 6 inches across when fully open, composed of eight orbicular-ovate petals, with a cluster of golden stamens enclosing the green, woolly pistils. The large, bright green leaves are biternate. Exhibited by Sir Frederick Stern, O.B.E., M.C., F.L.S., V.M.H., Highdown, Goring-by-Sea.

Phyllodoce breweri A.M. May 22, 1956. A semi-procumbent evergreen Californian shrub from 6 to 12 inches in height. The wiry stems are clothed with linear, serrulate leaves ¾ inch long. The flowers open successively in the axils of the upper leaves, forming a dense terminal raceme 4 inches or more in length. The individual flower is ½ inch across, saucer-shaped with five rounded lobes, Dianthus Purple (H.C.C. 732/2). Exhibited by Sir Henry Price, Bt., Wakehurst Place, Ardingly.

ORCHIDS

× **Angulocaste (Apollo g.) 'Goldcourt' F.C.C.** May 22, 1956. This bigeneric hybrid was obtained by crossing *Anguloa clowesii* and *Lycaste imschootiana*. 'Goldcourt', the latest cultivar of the grex to receive an award, has a large yellow, almost erect, flower about 5½ inches deep. The three large outer tepals have acute apices and are basically yellow with a light mottling of reddish spots. The laterals form a partial shield to the labellum, and these three tepals are spotted with a much deeper red. The apical portion of the labellum forms a rectangle and the whole tepal is surmounted by the creamy-yellow column. Exhibited by Miss B. Cooke, Wyld Court, Hampstead-Norris, Newbury (Fig. 101).

Cymbidium (Edenbridge g.) 'Stonehurst' A.M. May 22, 1956. A very large upright spike about 4 feet in height was exhibited. Ten flowers, each 5 inches by 4 inches were present on the spike of this cultivar. The parents are *C.* 'Balkis' and *C.* 'Ghurka'. The tepals are rather narrow and revolute, and the lowest two slope downwards at an angle of roughly forty-five degrees below the horizontal. The basic colour is creamy-yellow, flushed in places with pink, which from a distance appears orange. The labellum is large and open, with prominent side lobes. It is also nearly uniformly marked with dark red spots, an unusual occurrence with cymbidiums. The lower portion of the labellum has an undulating margin and a reflexed apex. Exhibited by R. Strauss, Esq., Stonehurst, Sussex.

Cymbidium (Flycatcher g.) 'Wheatley' A.M. April 17, 1956. Twelve blooms upon a curved spike were exhibited of this cultivar. As with so many whitish-flowered cymbidium cultivars *C.* (Alexanderi *g.*) 'Westonbirt' has a share in its make-up. The other parent is *C.* 'Delphine'. The tepals are white, with irregular patches flushed with pink.

The tepals of the outer whorl are incurved at the apices and the lateral tepals of the inner whorl are slightly reflexed. The creamy labellum has a broad band of rose-red near the lower margin, but a sharply defined narrow white band delimits it. The column is yellowish. Exhibited by Miss B. Cooke, Wyld Court, Hampstead-Norris, Newbury.

Cymbidium (Princess Elizabeth g.) 'Vanguard' A.M. May 1, 1956. This white-flowered cultivar has a bloom 4 inches wide by 3½ inches deep. It is chiefly distinguished from the other cultivar of this grex to obtain an award of merit by the diminution of the space between the outer and inner tepals. The dorsal is strongly curved forward, but the other tepals tend to be reflexed. The two lower outer tepals have a faint pink flush, and all the tepals are spotted with purple at the base. The labellum has spaced purplish-red spots in its lower half, and is surmounted by the purplish column. The parentage is *C.* (Alexanderi *g.*) 'Westonbirt' × *C.* (Princess Astrid *g.*) 'superbissima'. Exhibited by Lt.-Col. The Lord Hothfield, Castle Hill, Englefield Green.

Cymbidium (Roseleen g.) 'Buttercup' A.M. May 22, 1956. *C.* 'Rosette' and *C.* (Pauwelsii *g.*) 'Comte-de-Hemptine' are the parents of this yellow-flowered cultivar. The basic colour is supplemented by a reddish flush on the reverse. This latter colour suffuses through to the inside of the tepals, and is especially prominent near the base and down the centre of each tepal. The dorsal tepal is markedly incurved. The labellum is a clearer yellow, but has red markings present, forming an irregular band towards the apex. Exhibited by Messrs. McBeans Orchids Ltd., Cooksbridge, Sussex.

Cypripedium (Amaze g.) 'Purity' A.M. April 17, 1956. *C.* 'Boltonii' and *C.* 'Thebian' are the parents of this white-flowered cypripedium cultivar. The laterals are incurved, and the dorsal has a wavy margin. The latter tepal is completely white, but the laterals have an additional creamy flush towards the base. The labellum is predominantly cream, but the lower outer tepal standing out behind it is again white. The flower shown was 4 inches by 3½ inches. Exhibited by Miss B. Cooke, Wyld Court, Hampstead-Norris, Newbury.

Dendrobium (Valerie g.) 'Subha' A.M. April 17, 1956. This cultivar is of the *Dendrobium phalaenopsis* type. The parents are *D.* 'Owen' and *D.* 'Lady Constance'. Seven flowers, each 2 inches by 2 inches were present upon the spike exhibited. The colour of the blooms is almost uniformly of an intense magenta. The outer whorl of tepals are lanceolate with acute apices, and the two laterals of the inner whorl are broadly obovate. The rather long labellum bears a dark crest. The spike exhibited was flown from Penang by Ng Peng Wah and Tan Aun Phaik of 18 Pinhorn Road, Penang, Malaya.

Odontoglossum (Alispum g.) 'Lyoth' A.M. May 22, 1956. The parents of this plant are *O.* 'Alorcus' and the species *O. crispum*. Upon the plant exhibited was a spike containing six flowers, individual ones being 3½ inches by 3 inches. The tepals are strongly fimbriated and scalloped, with undulating margins. The predominantly white tepals

have a relatively small area blotched with reddish-mauve. The labellum is lacerated and strongly recurved in the lower part. Above this the tepal is flushed with yellow and also blotched with reddish-mauve. Exhibited by T. Morgan Richards, Esq., 1 Elmsway, Ashford, Middlesex.

Odontoglossum (Lartium g.) 'Lyoth Queen' A.M. May 1, 1956. The much hybridized species *O. crispum* was crossed with *O.* 'Clonius' to produce this large-flowered cultivar. Several blooms, each 4 inches by 4 inches, were borne on the spike exhibited. It has rather a flat flower with all the tepals strongly frilled and toothed. The basic colour is white, but each tepal in addition has a central irregular brownish patch. A pale mauve flush is present upon parts of the outer tepals. The upper part of the labellum is yellow and also bears a pronounced jagged crest. Exhibited by Messrs. Charlesworth & Co. Ltd., Haywards Heath, Sussex.

BOOK NOTES

"Flowers and Their Histories." By Alice M. Coates. Royal 8vo. 348 pp. Illus. (Hulton Press.) 30s.

So far as I know this book is unique. Simply stated, it is a history of 600 or more familiar garden plants. It gives the date and circumstances of their introduction; what the great herbalists and garden-writers through the centuries have said about them; the various uses to which they have been put; how they have fared in cultivation. Indeed a remarkable compilation of fact and legend, yet with all the freshness of original work.

Real learning is required to produce such a book and Miss Coates's reading has been vast, stretching from writers of classical times through Gerard and Parkinson and their successors to botanical and horticultural authorities of the modern period, taking in "Handley Cross" and Turgenev on the way! It would appear that few authors of distinction whose books bear on the history of plants are absent from the bibliography of five pages.

Learning, however, is one thing, and the presentation of it another, and Miss Coates has accomplished this with considerable art. She has arranged her material in the most readable way. Her sense of humour is highly developed and she has a great gift for quotation. When she quotes, as is often, the drollery (to the modern ear) and frequent shrewdness of the archaic language of the old writers is woven into her own writing so as to give point to both. This book has great entertainment value, but nevertheless, it is a serious, thorough, historical work, albeit illumined with a lively wit. The only way to do full justice to it would be by extensive quotation. The best that the reviewer can do is to say it is easily among the most entertaining and learned books that have recently come his way, and to recommend everyone interested in the history of gardening to read it as quickly as possible.

MORTON

"The Earth is my Canvas." By Percy S. Cane. Cr. 4to. 161 pp. Illus. (Methuen & Co. Ltd.) 42s.

This volume is composed of a series of descriptions by Mr. Percy S. Cane of some of the gardens he has made, prefaced by a discussion of garden-design in general. Falkland Palace, Dartington Hall and Hascombe Court are well-known names in these pages.

A very interesting section of the book is devoted to some outstanding public gardens and the like, which Mr. Cane has designed. Particularly notable is the setting for the buildings of the Kent Oil Refinery Ltd. in the Isle of Grain. Here the designer was confronted with a site exposed to the bitterest winds which reach this country and his skill taxed by the necessity of making use of plants which would neither be combustible

nor whose roots cause damage to underground oil pipes. A recent assignment has been designing the grounds of the new Imperial Palace at Addis Ababa.

I have mentioned these undertakings first, because not only do they indicate Mr. Cane's versatility, but also because it seems to me that in the future it will be such projects alone as will give due scope to a garden architect of his spacious conceptions, for it is to be feared that few private gardens will again be made on a scale appropriate to them. Mr. Cane clearly has a wonderful gift of making the most of a site and the fine photographs in this book testify to the charm and character he has imparted to many private gardens. But withal it has to be conceded that this is a book of dreams, dreams of beauty from the past, but dreams not likely to be realized again in the future. The noble vistas, the far-stretching terraces, the wandering glades, the broad borders of Mr. Cane's creation can have no place in the gardens of tomorrow. These will be small, often very small, and the problems of their design therefore quite different. Hitherto the beauty of small gardens has often come about rather fortuitously, though it has a valid tradition in the cottage gardens of England and is exemplified in certainly two famous gardens today. Henceforth where it is to be sought self-consciously it will depend upon such matters as sustaining continuity of blossom, contrasting form and texture of foliage, and subtle planning within narrow limits. Changed economic circumstances will make every man his own garden-architect and he will do well to study the best in the past. In this spirit he may turn to Mr. Cane's book.

MORTON

"Tomatoes for Everyone." By Frank W. Allerton. 124 pp. Illus. (Faber & Faber.) 9*s*. 6*d*. net.

This pocket-size book is written for the amateur and tells him in small compass everything he can possibly want to know about growing tomatoes at the least cost and with the least amount of equipment. If this were all it would be only another book to add to the legions of instructive practical handbooks turned out every year, though in this respect alone it would stand very high in the list for its lucidity, completeness and above all its sound commonsense, based on scientific knowledge. But it is also the first book of its kind which gives working details of the new method of so-called "Ring Culture", a system devised at the commercial Tilgate Research Station and combining some of the virtues of soilless cultivation with the older practice of growing in " sink pots", originally devised as a means of partially avoiding trouble from "soil sickness" and wilt disease in tomato houses. Briefly, Ring Culture is the growing of plants in bottomless containers filled with soil compost and standing on a base of inert aggregate such as sand or gravel. Nutrients are supplied in solution to the soil, and water to the aggregate, and it is claimed that different types of root system are developed in the two media with advantage to the growth of the plant. Certainly excellent results have been obtained with this method by amateurs and commercial growers alike and anyone interested in trying it will find full details in this book. In every way an admirable little volume, though the coloured frontispiece is a little unfortunate since the plants pictured appear, perhaps due to faults in the colour rendering, to be suffering from magnesium deficiency, iron deficiency, blotchy ripening, at least one virus disease and a leaf-rolling due to disturbance of the water balance.

R. H. STOUGHTON

"Hydroponics: The Bengal System." Second Edition. By J. Sholto Douglas. 145 pp. Illus. (Oxford University Press.) Rs. 7.

The cultivation of plants without soil, either in a nutrient solution according to the original method of Dr. Gericke, or in an inert aggregate such as sand or gravel watered with the solution, is now widely practised by commercial growers and by amateurs. For the latter, especially for those who have no proper garden, it offers the opportunity for growing plants cleanly and easily in a backyard or on a flat roof, without the bother of obtaining sterilized composts and the trouble of annual renewal of the soil, while providing an interesting means of observing nutrient effects on plants. To the commercial grower of glasshouse crops it is of interest for its saving of labour and the greater freedom from soil-borne diseases.

The author of this book writes primarily for growers in India and other tropical countries. His system does not differ fundamentally from the methods practised in temperate countries, but he has aimed throughout at simplicity in construction of the growing beds and in the routine operations. In this second edition many of the errors

of fact and theory to be found in the original edition have been corrected, but there is much pruning which might well still be done, especially in the chapter on nutrient solutions which is likely only to confuse the layman. Readers should not let themselves be carried away by the author's enthusiasm; soilless cultivation is an alternative to normal methods but not of such immense potentiality as this book would suggest.

Incidentally, if we must accept the unnecessary and pretentious word "hydroponics", must we also swallow "hydroponicum"?

R. H. STOUGHTON

"The British Delphinium Society's Year Book, 1956." 143 pp. Illus. 7*s.* 6*d.* And "Delphiniums from Seed." By R. Parrett. 32 pp. Illus. (British Delphinium Society.) 2*s.* 6*d.*

This *Year Book* contains details of the Society's activities together with a number of interesting articles. In his article on "Soils and Delphiniums" Mr. Langdon suggests treatments by which the fertility of various soils can be improved. A trilogy on the Giant Pacific Strain is contributed by the originator, Frank Reinelt, Mr. Knowles, who grows them in this country, and by Mr. Wootton, who describes Mr. Reinelt's collection in California. Mr. Parrett's excellent article on "Delphiniums from Seed"—printed also as a separate booklet—covers not only the actual growing but also seed saving and storing, treatment of plants up to their second summer and advice on selecting plants for vegetative propagation. The numerous monochrome photographs are good and so are the two colour plates in each publication.

"Mechanical Aids to the Smallholding." By Denys de Saulles. 120 pp. Illus. (C. Arthur Pearson, Ltd.) 12*s.* 6*d.*

One of the problems confronting an author of books dealing with advice on machinery is that when prices are mentioned the book tends to "age" in a relatively short time. This book does not escape this problem and much of the information will be useful for a limited period. The first chapters deal with the problem of the economics of mechanizing, and the sort of machinery that the gardener or small commercial grower should choose. In this latter approach the commercial man is perhaps misled to choose a new heavy two-wheeled tractor when a second-hand standard type tractor would be better to meet his requirements. The machinery covered is quite wide, including all types of cultivating and gardening equipment and also food mixers and hammer mills. The chapter on "How your tractor works" is much the same as that contained in so many handbooks and it is not always essential to assume that most people do not know the elementary principles of how a car works. The pages from 89 to 120 are a guide to the many different machines on the market and will save a person writing to the firms for further particulars. The prices will, however, be wrong by the time the book is read. The book will be interesting to those who are thinking of using some mechanical device. Since most machines are expensive good guidance is a sound investment and the price of a book is little by comparison.

E. R. HOARE, B.SC., M.I.E.E.

"Crab Apples for America." By Donald Wyman. 63 pp. (American Association of Botanical Gardens and Arboretums.) $2.

Dr. Donald Wyman of the Arnold Arboretum is well qualified to write on this subject and to correlate all the work which has been done in America, in particular at the Arnold Arboretum and in Canada, in recent years.

Much of the Canadian research has the object of producing forms of *Malus* hardy enough to stand the severe winters 50 to 60 degrees below zero F. and not necessarily of improving blossom or fruit. These are not of much interest to us in England and the book carefully stresses this point.

Besides giving comprehensive lists of the best crabs for ordinary garden use, those with spring and autumn coloured foliage, edible fruits, weeping and fastigiate forms are noted and will be found useful. There is a long list of those crabs which have been discarded either because they have been superseded by something better or have proved unsatisfactory. This is worthy praise as it clears the ground of a lot of rubbish which will benefit future authors. English gardeners should be grateful for a clear and concise work on this group of decorative small trees which are so popular here.

W. S. FOX

"Background to Beekeeping." By Dr. Allan C. Waine. 120 pp. Illus. (W. H. & L. Collingridge.) 15*s*.

In the foreword to his book Dr. Waine makes clear his intention to write primarily for those who are considering keeping bees and those who have only recently begun to do so, and states that he aims to outline the responsibilities, duties and pleasures of being a beekeeper, and to inform his readers what equipment is necessary, how much it will cost, and also how to obtain some bees. In large measure he has achieved his aims and has produced a readable and useful introduction to the craft of beekeeping.

Valuable features of this little book are the way in which its author has resisted the temptation to include too much, the care with which he has selected his material, and, by no means least, the way in which he has excluded many of the frequently repeated theories, unsupported by either beekeeping experience or experimentation, which encumber many of even the most recent books on practical beekeeping.

In a few places Dr. Waine does not appear to be fully conversant with recent discoveries. For example, when talking about uniting colonies, he says: "This open hostility is often said to be the result of each colony having an individual smell shared by all its inhabitants and thus being able to detect immediately the presence of intruders," and then goes on to state that nobody has ever brought forward clear evidence in favour of this theory. In point of fact, satisfactory experimental evidence was brought forward by von Frisch and Rösch in 1926 and was confirmed and considerably extended by Kalmus and Ribbands in 1952. Again, on page 87, we find repeated the old and completely unsubstantiated theory that "a queen most often mates with a drone from the hive in which she was reared".

There is a satisfactory index and a useful glossary of beekeeping terms, which, however, contains a few obvious mistakes, such as defining *honeydew* as "an inferior type of honey produced from extra-floral secretions of plants".

The faults mentioned are, however, minor ones which can easily be corrected in the next edition and do not detract seriously from the value of this well-written and well-illustrated little book.

COLIN G. BUTLER

"Australian and New Zealand Botany." By J. McLuckie and H. S. McKee. xx + 758 pp. Illus. (Associated & General Publications, Sydney.) In Great Britain £3 7*s*. 6*d*., Australia £4 4*s*. 0*d*.

It is stimulating to come across a textbook of botany that avoids most of the hackneyed types of the classroom and replaces them with fresh subjects of study from the Antipodes. The more so, when the new types are liberally illustrated by line drawings of excellent quality. The urge to provide such a book resulted from the unsuitability of English and American textbooks for Australasian students. McLuckie and McKee have produced an interesting and readable text based mainly on Australian plants, but using also a number that are alien to that continent though in common cultivation. *Macrozamia spiralis*, replacing *Cycas*, is treated in detail for the cycads, and *Hormosira*, one of the common brown seaweeds of Australian waters, supplants the bladder wrack of our northern textbooks. The Monterey pine (*Pinus radiata*, referred to as *P. insignis*) replaces the Scots pine, while *Lilium* and *Capsella* are convenient aliens on which to demonstrate embryo development. The Australian flavour of the book comes, however, more from the constant allusion to native species and local information than from the major types of the classroom. Australia is comparatively rich in insectivorous and parasitic plants, which are discussed at length in a chapter on heterotrophic angiosperms. The mechanism and structure of *Drosera*, *Nepenthes*, *Cephalotus* and *Utricularia* are illustrated, and among the parasites, *Loranthus*, *Cassytha*, *Olax* and *Cuscuta*. The allusions commonly have a practical bias; thus under *Leguminosae*, genera causing stock poisoning are mentioned as, also, the occurrence of a substance having the activity of a female sex hormone in some strains of subterranean clover.

Morphology, anatomy, physiology and chemical aspects of plants are discussed in the first 262 pages of the book. So much information is crammed into this space that the subject-matter is necessarily condensed and a fair knowledge of organic chemistry is needed to appreciate some of the chapters. The second part of 317 pages discusses the divisions of the plant kingdom and the final 179 pages treat more general topics, including nomenclature, classification, heredity and ecology, with short chapters on the floras of Australia and New Zealand and their history. The book is well produced and commendably free from errors.

R. MELVILLE

"The Small Garden." By C. E. Lucas Phillips. 416 pp. Illus. Revised Edition. (Pan Books Ltd.) 3*s*. 6*d*.

Considering the vast scope of this book this edition is remarkably good value. It can be looked upon as a guide-book to all those with a limited knowledge of the subject. The author still avoids using the orthodox method of nomenclature, which is a mistake, as many readers are now familiar with this, and quick reference would have been made easier. Plant lists and methods of pest and disease control have been considerably revised but in the latter case not quite enough. Every conceivable subject has been dealt with including the initial layout and design.

"Sweet Pea Growing." By Peter Brookes. 93 pp. Illus. (W. & G. Foyle Ltd.) 2*s*. 6*d*.

Mr. Brookes not only covers every aspect of the growing of this ever-popular flower but he also includes chapters on history and development, arrangement for the house and for exhibition, seed production, old and new varieties and, for those who want to try their hand at this fascinating branch of horticulture, one on breeding new varieties. There are a few line and monochrome illustrations which help to explain some of the points raised in the text. We hope that the dwarf 'Little Sweetheart' peas, described by Mr. Brooke and illustrated on the cover, will make an appearance at the R.H.S. shows soon, as there is great need for such plants in these days when everyone's aim is to save labour in the garden. This book will surely be of interest to all sweet pea growers and a valuable addition to this handbook series.

GILLIAN E. PETERSON

"Tomato Growing for the Amateur." By Louis N. Flawn. 95 pp. Illus. (W. & G. Foyle Ltd.) 2*s*. 6*d*.

As tomatoes may be grown in heated and cold glasshouses, frames, cloches and out of doors, there is no need for gardens, except in unfavourable districts, to be without a few plants. Mr. Flawn elaborates on this fact and then describes in detail the cultivation from the choosing of suitable varieties to the time of gathering the fruit. The chapter on pests and diseases may at first appear to be rather depressing but is really very helpful. The last chapter contains comments on some of the newer developments concerned with tomato cultivation, such as soil warming, use of hormones for setting fruit, trickle irrigation and ring culture. The last is a valuable method to use when the soil conditions are poor. The line illustrations and photographs are quite good but a clearer one on "stopping" would have been helpful. The absence of an index may become rather noticeable if a reader wants to make a quick reference.

GILLIAN E. PETERSON

"Cloche Cultivation." By G. B. Walkden. 77 pp. Illus. (W. H. & L. Collingridge Ltd.) 9*s*. 6*d*.

In this book, written specially for amateurs and beginners, Mr. Walkden covers thoroughly a remarkably large subject. The first four chapters contain information about such things as types of cloches, management, planning, soil preparation and the principles of sowing and planting. Three chapters are devoted to vegetables, flowers and fruit. His recommendations are good, though when making suggestions for strawberry varieties it would perhaps have been wiser to omit 'Auchincruive Climax' on account of its tendency to suffer from 'transient yellows'. There is also an interesting chapter on growing and curing tobacco. The numerous line and photographic illustrations are clear and are a useful addition to the text.

GILLIAN E. PETERSON

"Party Flowers." By Constance Spry. 80 pp. Illus. in monochrome and colour. (J. M. Dent & Sons Ltd.) 8*s*. 6*d*.

The text of this little book is largely an explanation of the forty-two reproductions of flower decorations, nineteen of which are in colour. The standard of these is relatively high so that the compositions are pleasing to the eye and the flowers are identifiable and natural. Many of Mrs. Spry's party flowers are for important occasions such as a state banquet, the Royal Coronation luncheon and other major social functions, but even from these we can derive basic principles in colour harmony, balance, the use of original material and the integration of flowers in their setting which can be applied to arrangements for a simple cottage or flat. Arrangements

inspired by Dutch flower paintings, Grinling Gibbons' carved swags and the famous print of striped tulips from Thornton's *Temple of Flora* show what can be done by a truly creative artist who looks about at the pictures and objects around her—and, incidentally, around us if we would but look and act.

LANNING ROPER

"The Most Beautiful Alpine Flowers." Water-colours by Mila Lippmann-Pawlowski. Translated from German by Oscar Konstandt. (Umschan-Verlag, Frankfurt/Main and Pinguin-Verlag, St. Johann/Tirol.) Distributed by Barmerlea Book Sales Ltd. *7s. 6d.*

A useful pocket book in which over fifty alpine flowers are illustrated and described. The illustrations in water-colour are good and should be helpful when identifying the flowers. The descriptions include the English, local and Latin names, and if the plants are protected in any regions this is also stated.

"Exotic Plants." By Alfred Byrd Graf. 96 pp. Illus. 3rd Edn. (Julius Roehrs Company, New Jersey, U.S.A.) $3.

Almost thirteen hundred plants native to the tropics and sub-tropics are briefly described together with suggestions for their care and culture as house plants. Each plant is illustrated in monochrome and there is a number of additional photographs which give an idea of the natural background and uses of some of these plants.

"Intensive Gardening." By Dalziel O'Brien. 183 pp. Illus. (Faber & Faber Ltd.) *21s.*

In this book the author encourages "no-digging" methods and maintains that digging is not only unnecessary but actually detrimental to soil fertility. Miss O'Brien also sets out to prove that all-vegetable compost surpasses the value of both animal and chemical manures. The use of a spade is limited to compost making and the soil is never disturbed to a depth of more than 4 inches. After reading the detailed "Motion Study" chapter it seems hard to believe that anyone will follow each operation stage by stage—indeed, it will be some time before growers adopt many of the revolutionary and unorthodox methods set out in this book. Clear photographs and line drawings help to illustrate points made in the text.

"Origin and Distribution of the British Flora." By J. R. Matthews. 176 pp. (Hutchinson's University Library.) *8s. 6d.*

This interesting book by the Regius Professor of Botany at the University of Aberdeen is an examination of the flora of Great Britain, with an eye to the present-day distribution of plants and to their occurrences in prehistoric times. This critical study brings to light much that will be of interest to both the serious botanist and to the general reader with an enquiring mind. There are interesting floristic lists at the end giving the species in the several elements which he has selected such as the Mediterranean, oceanic southern, oceanic western European, continental southern and various others.

"The Gladiolus for Garden and Exhibition." By D. Gourlay Thomas. 96 pp. Illus. (W. H. & L. Collingridge Ltd.) *15s.*

The Reverend Gourlay Thomas, who is a skilled cultivator of gladioli, has written a popular book which will be welcomed by the novice. He writes in a pleasantly light vein but one which may not appeal to the serious gardener or professional grower as at times his text becomes far more a matter of personal taste and opinion rather than factual presentation. The book is well illustrated and covers in some detail the cultivation and the uses of gladioli.

"Chromosome Atlas of Flowering Plants." 2nd revised and expanded edition. By C. D. Darlington and A. P. Wylie. 8vo. 519 pp. (Allen and Unwin Ltd.) *60s.*

The first edition of this work compiled by Dr. C. D. Darlington and E. K. Janaki Ammal appeared in 1945 and dealt with cultivated plants only. It has since been expanded considerably to include other flowering plants and deals with over 15,000 species. For each species the somatic number of the chromosomes is given, the authority who made the count, an indication of the use which may be made of the

plant and of its distribution. In the Preface the authors point out that the stability of chromosome numbers appears to be a function of the length of the life cycle. Thus woody plants are very stable, but ephemeral plants are in varying degrees unstable. Undoubtedly, this atlas will form a valuable work of reference for those studying the systematics and evolution of plants as well as for the plant breeder. An exhaustive bibliography of forty pages completes the book.

PATRICK M. SYNGE

"The Cultivated Mushroom." By André Sarazin. 76 pp. Illus. (Published 1955 by the Mushroom Growers' Association.) 10*s*.

This volume, which was translated from the French by Dr. C. J. La Touche, is a work of considerable importance for the scientific grower of cultivated mushrooms, for it contains a very complete summary of the purely scientific aspects of morphology, germination, development, cytology, evolutionary cycle, cultivation and nutrition of edible mushrooms. This work is not designed for the amateur but for the serious and experienced student or cultivator who wishes to understand the position of the mushroom in the broad plant world and its development cycle as well as its nutritional and environmental requirements. It is copiously illustrated with microscopic photographs of cells, basidiums, spores and the phases of meiosis, etc., to name but a few.

"The Fred. Atkins Alphabet for Mushroom Growers." 28 pp. (The Mushroom Growers' Association.) 5*s*.

The author's note on page 2 sets out the purpose and the content of this useful booklet so well that we reproduce it here. "This Alphabet has appeared in instalments over the past two years in the MGA BULLETIN, and is now assembled for more handy reference in one volume. It was originally intended as the outline or foundation of an Encyclopaedia of Mushroom Growing, but now there seems to be less and less time to do what one sets out to do, and an Encyclopaedia could be a life's work." The definition of the terms including the scientific names of the more important species of different genera, sprays, fertilizers, processes, physiological terms, etc., are briefly but very adequately defined.

"Carnations." By Peter Allwood Fenn. 94 pp. Illus. (Foyles.) 2*s*. 6*d*.

This is a useful book which can be recommended to the amateur. The propagation and cultivation of all types of carnations are covered fully, considering the size of the book. Soilless cultivation is also touched on briefly and there is a useful chapter on showing border carnations.

"Labour-Saving Gardening." By Fred Streeter. 160 pp. Illus. (Odhams Press Ltd.) 8*s*. 6*d*.

Mr. Streeter's book will be of particular interest to the novice or to anyone making a new garden as the tips and ideas which he has acquired during his life-long experience will prevent many disappointments. Every section of the garden is dealt with and readers need have no fear of being confronted with numerous unfamiliar names as these are restricted to a few good plants for each section. There are, however, a number of misspelt names—possibly printers' errors—which might be misleading. Forty photographs help to emphasize some of the author's points and the book is written in a style well known to many of his followers.

"How to Grow African Violets." By Carolyn K. Rector. 95 pp. Illus. (Blandford Press.) 9*s*. 6*d*.

African violets are particularly good house plants and it is chiefly with this in mind that the author writes. Great attention is paid to detail, especially to the various methods of propagation, potting-composts, potting, watering, etc. Large-scale growers may find some methods rather "fussy" but they will also find much to interest them.

"Geranium Growing." By H. G. Witham Fogg. 96 pp. Illus. with line drawings and photographs. Foyle's Handbooks. 2*s*. 6*d*.

The author complains that he has not had access to the rather expensive books on the subject, but they are available at the principal libraries, and there are books on Botany in all the libraries. There are also plants at Kew which he does not appear to

have seen. If he had seen *P. triste* in bloom there this summer he would not have used the illustration on p. 11; and if he had seen Dr. Hutchinson's drawing, of *E. cicutarium* in *Common Wild Flowers*, p. 226, he would not have made the slip on p. 85.

There are some strange spellings, three on p. 62. There are more serious errors. Compare the Shining Crane's-bill on p. 77 with that of Dr. Hutchinson in *Uncommon Wild Flowers*, p. 588. Then there is the queer notion, taken from a Californian catalogue, that geraniums can be divided into two classes, a Standard type and a Bruant type. Such a distinction has no foundation in fact and is not based on the work of the French hybridists. M. Bruant, of Poitiers, in common with Crousse, Duval, Baboullard, Boucharlat and Lemoine, produced a great many new varieties, most of which have disappeared. Some of the survivors are known by their English names.

There are a few good photographs, and the cultural directions are mostly sound and useful. But what can any reader make of the following?—"These Regal, Show or Fancy Pelargoniums were at one time separate species, but the uniting of several of these caused the distinctive divisions to be lost in the one group of attractive varieties."

D. MARTIN ROBERTS

"Amateur Gardening Picture Books. Edited by A. G. L. Hellyer. Illus. (Collingridge.) 6*s*.

These admirable little volumes appear to be the first three of a new series with the object of demonstrating the culture of particular kinds of plants by photographs, accompanied, where necessary, by a simple explanatory text. Gardening is after all a traditional art and happy he who has learnt its processes by observing a skilled gardener of long experience. This cannot be given to all and as it is much easier to learn how to do a thing, e.g. taking cuttings, by seeing how it is done rather than by reading about it, these three little books promise to be very helpful indeed to the beginner. Each illustrates in 60 pages and over 120 very clear photographs the fundamental operations in the cultivation of chrysanthemums, roses and tomatoes respectively.

MORTON

"My Garden." By Theo A. Stephens. Pp. 192. Illus. (Faber & Faber.) 15*s*.

This volume is to a large extent based on Mr. Stephen's contributions to the *Sunday Times* and bears the journalistic stamp which has become so familiar to his very wide circle of readers. As a result there is little of the unexpected about these articles which range over a number of subjects of interest to the gardener. There is, of course, a great deal to be learned by those who want such short discussions, for Mr. Stephens is a master in his field and his knowledge is very wide as the result of rich experience and travel. I find, however, the growing tendency to make into serious books the writings on a series of unrelated subjects originally circulated at the appropriate time of the year in the press, one to which I cannot wholly subscribe. Secondly, I am inclined to the view that the directness and universality of appeal of much newspaper style makes gardening articles, in spite of additions and editing, quite different reading from what they would be if written for publication as a series of essays on the same subjects by the same author.

The illustrations, especially those of his own garden, add much to the interest of the book for they give an insight into what the author has created. The lack of illustrative material is one of the handicaps of the gardening columnist in the Daily and Sunday Press.

LANNING ROPER

"New Light on Apple Yields in Kent." By R. R. W. Folley and A. H. Rowe. (Wye College.) 2*s*. 6*d*.

This report on the yields of apples on fifty-two farms in Kent for the years 1948–52 merits close study by all apple growers.

The compilers have devoted much time to analysing the results of their investigation in several ways and have arrived at certain tentative conclusions indicating the part that management appears to play in attaining satisfactory yields.

It is interesting to see how each area appears to suit different varieties and astonishing how yields vary from farm to farm.

The effects of weather have, however, been so incomprehensible during these years, that a further period is needed to determine with any certainty what progress growers are making in increasing yields.

In view of the interest shown by most growers in developments in the world of research, it will be disappointing if the next report does not show a material increase in mean yields.

T. NEAME

"Simple Rose Growing." By A. G. L. Hellyer. Sm. 8vo. 112 pp. 56 illustrations, photographs and line blocks. (Collingridge, London, 1954.) 7*s*.

Mr. Hellyer is well known in the horticultural world as a writer and editor, and his name on the title page of a book is sufficient guarantee of clear style and attractive presentation. There are already innumerable popular books on rose-growing. This one is notable for a realistic approach to the problems of the amateur, who so often cannot choose a site that is ideal, or plant at the time of year that the Literature decrees he should. *Simple Rose Growing* tells how to face these handicaps, and describes in non-technical language everything about roses from selecting the right kinds to grooming them for the exhibition table. First published in 1930, this latest edition has the illustrations and select lists brought up to date. The text occasionally shows its age, as in the section on "Rock garden roses" which mentions only *R. roulettii* and *R. spinosissima* and none of the modern miniatures. One illustration has been needlessly repeated (pp. 63, 92), but apart from that this is a good and inexpensive primer for the newcomer to roses.

G. D. ROWLEY

"Apple Grading and Packing." (Bulletin No. 84 of the Min. of Agric., Fish. and Food.) 76 + iv pp. Illus. (H.M.S.O.) 4*s*. 6*d*.

British fruit and vegetables are among the finest in the world but for too long there has been a serious lag in the methods of packing and presentation to the consumer. This revised bulletin will do much to rectify this deficiency, for great thought has gone into the preparation to bring it up to date with the most modern methods of packing as well as the actual materials used. For the commercial raiser of apples this bulletin is indispensable.

The following books have been received:

"Report of the Committee on Hedgerow and Farm Timber, 1955." Forestry Commission. 64 pp. Illus. (H.M.S.O.) 3*s*. 6*d*.

"Report on Forest Research for the year ended March 1955." Forestry Commission. 140 pp. Illus. (H.M.S.O.) 5*s*. 6*d*.

"Gardening Handbook." By Thomas H. Everett. 144 pp. Illus. (Fawcett Publications, Inc.) 75 cents.

"How to grow Beautiful House Plants." By Thomas H. Everett. 144 pp. Illus. (Fawcett Publications, Inc.) 75 cents.

"Mes Amies les Fleurs—Plantes de Rocailles." 32 pp. Illus. (La Maison Rustique, Paris.) 160 French francs.

"Soil Survey of Great Britain." Reports Nos. 1–5. Agricultural Research Council. (H.M.S.O.) Prices, No. 1, 1*s*. 6*d*.; No. 2, 2*s*. 0*d*.; No. 3, 3*s*. 0*d*.; No. 4, 3*s*. 6*d*.; No. 5, 3*s*. 0*d*.

"Successful Wine Making." By S. M. Tritton. 36 pp. (Grey Owl Research Laboratories, Almondsbury, Glos.) 5*s*. 0*d*.

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This second edition has not been reset, but opportunity has been taken to correct cross-references, insert some new Botanical Magazine numbers, and to make other small alterations. For larger corrections the reader is referred to the Additions and Corrections Section in the Supplement, by the insertion of suitable symbols at appropriate places in the Main Work.

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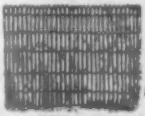

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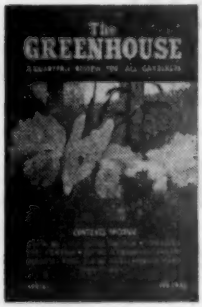

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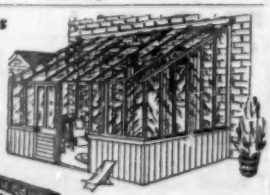

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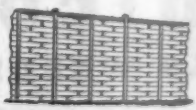

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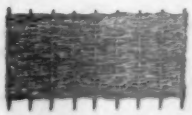

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